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Theoretical and Empirical Analysis of Accounting and Market Betas of Finnish and UK companies

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Abstract

The research was aimed at exploring the degree of association between stock returns and market and accounting based risk measures. The analysis was conducted over a period of five years on the basis of companies' data, which represent Finnish and UK markets. The main objectives were to ascertain whether market and accounting betas are capable of predicting future stock returns and to discover the level of correlation between risk measures in the cases of UK and Finland.

Secondary numeric data was obtained from official databases and financial statements of the companies. The usage of the SPSS software enabled conducting two types of research: correlational research and multi-variate linear regression. Correlational research provided information concerning the level of association between two variables whereas the multi-variate linear regression extended this knowledge by enabling the author to determine the degree of influence of all the independent variables on the dependent.

The results reveal that market beta is not capable of predicting future stock returns separately for each of the markets, but for the larger sample the market beta has illustrated its potency in reflecting the market movements on stock returns. Nevertheless, the substantial dependence of market based risk measure on extraneous factors such as sales, assets, and earnings per share indicate that accounting variables should also be considered for a precise estimation of returns. The outcomes of the accounting based risk measure analysis show that such measure possesses a more significant predicting power than market based risk measure. Therefore, while accounting based risk measure and stock returns are positively associated, there is no evidence supporting the idea that there exists a positive relationship between market and accounting based risk measures.

Keywords/tags (subjects)

CAPM, Market Based Risk Measure, Accounting Based Risk Measure, Beta, Market Beta, Accounting Beta

Miscellaneous

Appendices attached (54 pages)

Contents

Tables

Figures

1. Introduction

Investment appraisal remains one of the crucial aspects of financial management. Because each investor faces the problem of determining in which company, project or stock to invest, the importance of the cost of equity estimations cannot be denied. The cost of equity epitomizes the required rate of return, at which investors are willing to invest in the stock. In other words, the cost of equity can be referred to as the opportunity cost of investing in a certain stock and abstaining from any other investments with an equal amount of risk (Pratt 2002, 3). One important aspect at this stage is that the amount of returns received by investors in the future is precarious, and, therefore, the cost of equity also includes the risk premium, which indicates an additional compensation for investing in risky stocks, when compared to risk-free stocks (Witmer & Zorn 2007, 1). In the theory of finance there exist several techniques for the calculation of the cost of equity. However, no consensus is reached among theoreticians and practitioners concerning the model with the most precise estimations. Taking into account the necessity of the cost of equity for capital budgeting and investment purposes, it is highly important to determine the most practical and veracious model for its computation (Kolouchova & Novak 2010, 2).

One of the most widely implemented models for the estimation of the cost of equity is the Capital Asset Pricing Model (hereafter, CAPM). CAPM deals with two types of risks: a systematic risk, which is intrinsic to the whole market, and a non-systematic risk, which is related to the company solely. This model is based on the implications of the portfolio theory averring that it is possible to reduce the non-systematic risks by combining several stocks in one portfolio (Markowitz 1952, 79). Therefore, CAPM perceives a systematic risk as the one designating risk premiums. As a result, market beta, which represents the measure of the systematic risk, assesses the sensitivity of stocks against the market. According to CAPM, amounts of risk

premiums should be proportionate to market betas. The model is achieved through the regression analysis and provides investors with the direct number indicating the amount of return that investor can demand. Notwithstanding the initial simplicity of CAPM, the model is widely criticized as a measure that is not capable of providing trustworthy outcomes (Fama & French 1993, 4). Furthermore, CAPM is only suitable for the publicly traded companies, for which market data can be easily accessed, while leaving non-publicly traded companies outside of its scope.

To address the failures of CAPM, accounting based risk measures were developed. Such measures are similar to the Capital Asset Pricing Model with the exception that accounting data is used rather than market information. Thereby, accounting returns are calculated with the usage of financial statements; the market proxy is created from the sample of the studied companies and an accounting beta is derived. Accounting based risk measures also possess several drawbacks, such as the need for consideration of longer time periods, because the information is only revealed by companies few times per year; and the necessity to create market proxy as no accounting information for the whole market exists (Burger 2012, 16). However, despite its disadvantages, accounting based risk measures veraciously reflect the business conditions of the company, thus, diminishing speculations with betas and returns (ibid., 17).

It is important to underline that the initial CAPM model implies the usage of betas derived from the market information; the model previously did not have a need to specify such beta as market beta, as it was the only type that was used. However, for this thesis it is important to make a distinction between market and accounting betas, as they are obtained from different sources of information and might not coincide with each other. Thus, the term beta will not be used in this thesis without justification of the data source in order to avoid vagueness; only the terms “market beta” and “accounting beta” will be used to give precise information of the type of beta.

Both of the approaches provide investors with information concerning future stock returns. However, none of these techniques so far can be called transcendent, as both of them are highly debatable. The presented methods for estimating the cost of equity remain widely examined among scholars with the purpose to determine whether market beta provides similar outcomes to the ones from accounting beta and which of the results are more precise and trustworthy. The recent studies conducted in this field show no or little similarity in terms of the findings, thus, leading to the ambiguity and ambivalence of the predictions concerning market and accounting betas. Therefore, the research problem of the current study lies in assessing the predictability power of both methods and determining whether the results gained from CAPM and the accounting based risk measure complement each other on the examples of Finnish and UK companies. This study will contribute to the development of the theories aimed at the estimation of the cost of equity by providing the research outcomes that are valid in the settings of the Finnish and UK markets, and might serve as a basis for further analysis.

The research questions deduced from the research problem are as follows:

1. Is market beta capable of successfully reflecting the impact of market return movements on a company's stock return?

2. What is the direction of association between accounting beta and accounting stock returns?

3. What is the relationship between market beta and accounting beta?

Thereby, the main objectives of this study are to ascertain whether market beta is sound in its predictions of future stock returns, to determine whether accounting beta is positively correlated with accounting stock returns, to analyze the degree of association between market and accounting betas and to identify which one of betas provides more precise estimations.

In order to answer the research questions, the analysis of the market and accounting information of the sample consisting of 60 Finnish and 80 UK companies on a yearly basis for a 5 year period was conducted. The secondary market data was obtained from the databases, which was later modified to meet the requirements of the statistical models. The secondary accounting information was collected from the financial statements of the companies. Dependent and independent variables were further assigned and analyzed with the help of statistical program SPSS software. Two types of analysis were carried out, such as the correlational analysis and the multi-variate regression analysis. The correlational analysis enabled to observe the degree of association between two variables, while the regression analysis extends this knowledge by providing information concerning the influence of several independent variables on one dependent and displays these relationships as an equation that allows making further predictions.

When it comes to the findings of this study, several important aspects were discovered that enabled to answer the research questions, meet the research objectives and enrich understanding of the cost of equity estimation techniques. First of all, it was ascertained that the performance of the CAPM is contradictory. The model was proven to be valid and highly effective in the predictions for the large sample. However, for the smaller samples the results were not promising. In the country-level cases the market beta was unable of productively reflecting the changes in the market movements on the stock returns. In that case, the model was rejected as being inefficient and fallacious. For the accounting beta, the results indicated that there exists a positive association between accounting beta and accounting stock returns, which has indicated that accounting beta is capable of successfully predicting the accounting stock returns. The accounting based risk measure has illustrated its efficacy regardless of the sample size and the length of the period examined. Therefore, it was acknowledged that accounting beta has a great potential, which is still to be

discovered further. Predictably no positive correlation was determined between accounting and market betas. The direction of association between betas is negative, thus, the betas do not provide similar results concerning the market and accounting stock returns.

The structure of this study is tailored to provide the readers with the theoretical background on the examined issue by introducing such concepts as risk and return, beta, the Capital Asset Pricing model, the Arbitrage Pricing Theory and the accounting based risk measure. These chapters will serve as a basis for a deeper understanding of the research problem. The empirical literature review, presented in the next chapter, provides additional information on the most valuable studies conducted in the area of the estimation of cost of equity. On the basis of the theoretical part and the empirical literature, the hypotheses are formulated. The “Methodology” chapter describes the research design, data collection techniques, sampling and analysis methods that were implemented to answer the research questions. The chapter “Results” covers the outcomes of this study explaining the main features of the datasets and the relationships between the variables. This section explores the findings in relation to the specified hypotheses. The “Discussion” chapter follows the “Results” part, where the outcomes of this study are compared with other similar researches in this field, limitations and recommendations are specified and conclusions are drawn.

2. Theoretical Background

The complex topics of the project appraisal and the estimation of the cost of equity are discussed in this section. “Risk and Return”, and “Beta” are the introductory subchapters that provide initial knowledge about types of risks, diversification and beta. Furthermore, two main theories “Capital Asset Pricing Model” and “Accounting Based Risk Measure” are presented, as well as one additional theory “Arbitrage Pricing Theory” that provides an alternative view on the topic of assessment of cost of equity. Familiarization

with theoretical framework is of a crucial importance for further understanding of the research process and methodology.

2.1 Risk and Return

Modern financial markets operate in the uncertainty settings. Investors cannot precisely predict the exact amount of return they will earn from the project. The reason behind that is the existence of risk. Risk can be defined as the possibility of actual returns being different from the ones predicted.

Various investments bear unequal degrees of risk. Government debt securities (for example, US Treasury Bills) are known as one of the safest investments due to the low risk of default (Brealey, Myers, & Franklin 2011,156). However, there exists uncertainty even with the safest investments because of the inflation rate, which might decrease the amount of real return. Thus, it can be concluded that every investment is risky.

The general rule in finance states that the riskier the investment, the higher return investors can demand for bearing extra risk. Each investor decides for himself the volume of risk to bear based on own preferences and characteristics. Such perception helps to distinguish between risk averters and risk lovers (Arnold 2013, 191). Risk-averse investors prefer specified income over the risky one. Such investors do not tolerate risk and are willing to invest exclusively in safest projects. Risk lovers are opposite to risk averters. They tend to choose higher and riskier income.

Despite the personal tolerance of risk, each rational entity should invest in the projects that promise higher return than the minimum acceptable return on investment (hurdle rate). In other words, hurdle rate imposes the minimum qualification on the project before it is considered acceptable (Hundal 2014). Hurdle rate might be expressed as the sum of the riskless rate and the risk premium. Riskless rate represents the return that

investor can get from risk-free investment. Practically, risk-free investments do not exist, because even the safest investments bear minimum risk. However, US Treasury bills' interest rates are commonly used as a benchmark. Risk premium is the additional return investors require for bearing extra risk.

The most typical way to measure the riskiness of the stock or portfolio is to use statistical measures such as variance and standard deviation (Brealey, Myers, & Franklin 2011, 163). Variance represents the stock's volatility. It shows how far stock's value can move away from the mean. The bigger the number, the more volatile stock is, and, therefore, more risky.

However, there exists a way to reduce volatility. Modern portfolio theory claims that adding more assets to the portfolio (diversification) is a way to decrease volatility (Markowitz 1952, 79). It is important to mention that inclusion of assets in the portfolio with the purpose of volatility decline is not limitless. The pace of volatility reduction from additional assets diminishes with the growing number of those assets being included (Womack & Zhang 2003, 3). Diversification is only possible because overall risks can be divided into few categories: systematic and unsystematic risks.

Systematic Risk (also referred to as un-diversifiable risk or market risk) is unavoidable risk, which is integral to the market as a whole. Such risks cannot be neglected through diversification. Systematic risks can only be decreased through hedging. Systematic risks are represented by interest rates, inflation, recession, war etc.

Unsystematic risk (diversifiable, company specific risk, residual risk) is the type of risk, which has an impact only on the certain group of securities or individual security. Such risks are inherent to every investment; however, their negative impact can be reduced through diversification. Company

related risks can be: (1) project-specific, which implies that various projects of the company might have different cash flow from what was expected; (2) competitive risk, which places the company in a risky situation due to rival's actions; (3) industry specific risks, which affect the whole industry or sector; (4) international risks that arise while dealing with foreign currencies.

Diversification helps to eliminate firm related risks because each investment represents much smaller percentage of the portfolio, muting the effect of the overall portfolio; firm related actions might either be positive or negative and in a large portfolio, these effects may even out each other (Hundal, 2014). Likewise, whenever the portfolio is fully diversified, its volatility equals the volatility of the market (Womack & Zhang 2003, 4).

It is important to mention that the described above measure of risk- variance- evaluates the total risk of investment, both systematic and unsystematic.

But since the investors can radically decrease the impact of the company specific risks through diversification of their portfolios, then they should not be assigned with additional return for the risks they can avoid. Risk premium is only allocated for market risk, which is impossible to diversify.

However, the risk of portfolio is related not only to the riskiness of each individual asset, but also to the degree of covariance between the returns of these assets (the degree of similarity between two variables; the direction of movement). It means that when the assets comprising portfolio are positively correlated they tend to move upwards and downwards in value together, in that case diversification does not guarantee full elimination of risks, but if the returns are negatively correlated and move counter to each other, then diversification would be able to eliminate those risks (Markowitz 1952, 89).

2.2 Beta

Diversified investors perceive the riskiness of the projects only as the systematic risk. Beta coefficient represents the standardized measure of such non-diversifiable risks (compare to standard deviation, which measures total risk). Beta assesses the covariance between returns on a share with market returns (Arnold 2013, 286). In other words, beta measures how sensible (volatile) stocks when measured against markets. The concept of beta is described on the example of market beta. However, with certain modifications in the data source such idea also applies to the accounting beta, which will be specified and described in more details in the following chapters.

To compute market beta, historical data on security and market level returns should be obtained. It is a common practice to perceive indexes such as FTSE250, S&P500 as a benchmark for measuring market returns. These indexes contain a vast variety of top-level companies shaping the market, and therefore appear its authentic representation.

Beta of the i^{th} firm can be calculated with the help of the regression analysis using the following formula:

$$\boldsymbol{Beta_i = (Covariance\ (r_i, r_m) / (variance\ r_m)}$$

r_m - return on market portfolio
r_i - return on stock

The value of the market beta provides information about the sensitivity of the stock return to market return movements. The market is perceived to have beta equal one. If the value of stock beta is equal one, it means that the share has a tendency to move along with the market. In other words, 1% change in market index returns will result in equal change in the stock returns. It can be concluded that in such case stock returns are correlated with market returns to a significant extent. If beta of the stock is less than

one, then changes in the market index lead to smaller changes in the returns of a certain share. It means that as long as the market is rising at 1%, stock returns will rise at a slower pace (less than 1%). However, when market is falling at 1%, the stock returns will not fall that rapidly. If beta is more than one, then 1% changes in the market lead to greater changes in the returns on a share. In that case stock returns are aggrandized, when compared with market returns. Having stock with beta more than one might be profitable for investors as long as market is rising, as in that case stock returns outpace the market returns. Despite its probable profitability, such stock also poses a threat, when market is falling, as in that case the stock's losses will exceed market losses.

2.3 Capital Asset Pricing Model

The Capital Asset Pricing model (CAPM) was created in the mid-1960s by William Sharpe, John Lintner and Jack Treynor. This economic model describes the relationship between the risk and the amount of the required return for bearing such risk (Lofthouse 2001, 52). It provides investors with the idea of what the return on their investment should be. According to the CAPM, market beta is the only measurement of security risk. Therefore, the expected risk premium varies in direct proportion to the market beta (Brealey, Myers, & Franklin 2011, 193).

The security market line (SML) represents the graphical depiction of CAPM (see Figure 1). If the Treasury bills have a beta of zero (assuming no risk), then the risk premium also equals zero, and the expected return equals risk-free rate. However, the efficient market portfolio with beta 1 has the market risk premium of Rmt-Rft (the expected return on security with beta one equals the expected return on the market). Hence, there appears two points of reference for risk premium. Connecting such points leads to the creation of the security market line (SML), where risk premium is proportional to beta. Therefore, in equilibrium conditions all investments must be located along the security market line (SML).

Moreover, the security market line (SML) also tells whether a stock or a portfolio is properly priced.

The formula for calculating the expected return on security:

$$R_{it} = R_{ft} + \beta * (R_{mt} - R_{ft}),$$ where

R_{it} - expected return on security

R_{ft} - risk-free rate

β - Beta of security

R_{mt}-R_{ft} - market risk premium (the difference between expected return on the market and the risk-free rate).

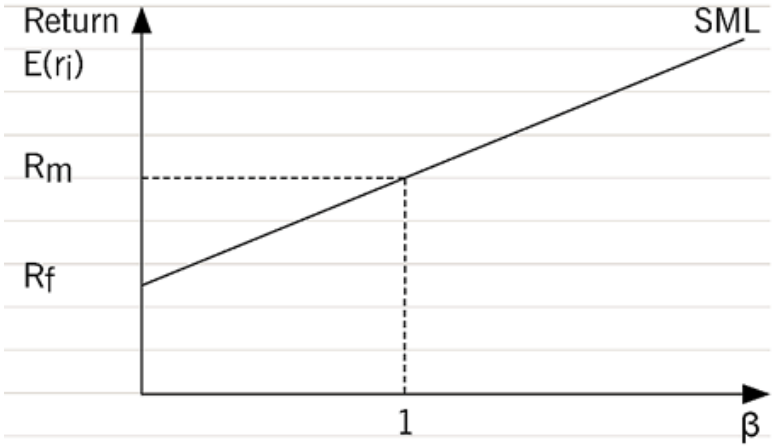

Figure 1: Security Market line (SML) (CAPM: Theory, advantages and disadvantages, 2015)

The formula described above is a traditional equation. However, for the statistical purposes its version was modified. The empirical CAPM calculations are made using the following formula:

$$(r_{it} - r_{ft}) = \alpha_{it} + \beta_{it} * (r_{mt} - r_{ft}) + u_{it},$$ where

r_{it} - rate of return on security i in period t

r_{mt} - rate of return on market portfolio in period t

β_{it} - market beta for security i in period t

r_{ft} - risk-free rate of return in period t

u_{it} - error term (in a well-diversified portfolio u_{it} equals zero)

α_{it} - Jensen's alpha

Jensen's alpha indicates whether a portfolio earns more or less than the return predicted by CAPM. In other words, Jensen's alpha specifies how far the portfolio returns deviate from the expected returns (Samarakoon & Hasan 2005, 617). Jensen's alpha provides investors with an opportunity to determine whether a portfolio is earning a sufficient return for the level of risk it bears. Jensen's alpha can have a value greater, less or equal to zero. Therefore, positive alpha means that additional returns were obtained.

As can be observed from the formula presented above, the modifications were done through the subtraction of the risk-free rate (Rft) from left and right sides of the equation. Thus, the (Rit-Rft) indicates the excess stock returns, which are greater than the risk-free rate, and (Rmt-Rft) reflects market returns after the deduction of risk-free rate. In this thesis, the empirical formula will be used with the returns considered after the subtraction of the risk-free rate (from both stock and market) rather than simple rates of return (Rit; Rmt).

Initially, CAPM deals exclusively with the market data retrieved from databases, because the calculations of stock and market returns are made with the help of historical prices of shares. Therefore, CAPM employs the term "beta" implying the usage of "market beta". For the clarity of this study, only the term "market beta" will be used in relation to CAPM to avoid confusion with the term "accounting beta", which will be discussed later.

CAPM might be found applicable in several areas: portfolio selection; figuring out the mispriced shares; measuring portfolio performance; determining the required rate of return on a project (Arnold 2013, 292). On the basis of the market beta investors are free to decide the riskiness of their portfolio. Risk-averse investors might choose to include only low market beta securities in their portfolio, and risk lovers would choose high market beta securities with more risks involved. Furthermore, with the help of CAPM investors are able to determine the shares that are mispriced on the market. For example, if the expected return of a share is higher than the rest with the same market beta, then investors would strive to buy it. CAPM also helps in assessing the performance of the portfolio by finding out whether the selection of shares was good enough and outperformed the market. Moreover, since companies are dealing with various business areas, the riskiness of their projects cannot be measured by a single market beta. Thus, each investor is able to demand a higher return on the new company's project, if this project is more affected by the systematic risk.

Despite its popularity and wide usage, CAPM has several drawbacks, which impede its implementation. First, there are difficulties with determining the market beta. Even though the calculations behind it are straightforward, it is not completely clear which time period should be taken and should the data be daily, monthly or weekly. Depending on the personal choice, beta might have different value, which makes the predictions less accurate.

Second, the Capital Asset Pricing model is based on the assumptions concerning the behavior of investors. Some of these assumptions are criticized by economists for being too unrealistic. The assumptions of CAPM are: investors are rational and risk-averse; the possibility of unlimited borrowing and lending at a risk-free rate; no taxes and transaction costs; all assets are traded; there exists a risk-free investment

(Treasury Bills). Practically, it is obvious that some of these assumptions are far from reality (Arnold 2013, 297).

2.4 Arbitrage Pricing Theory

The Arbitrage Pricing Theory (hereafter, APT) was created by Stephen Ross in 1976. APT as well as CAPM is aiming at explaining the relationship between risk and return, thus expounding the formation of asset prices. Both theories claim that unsystematic risk affecting individual assets can be diversified, hence, systematic risk is the one that should be rewarded. However, there exists a crucial difference between the models. CAPM assumes that the only risk factor is the market, whereas APT implies that several systematic factors influence the returns on securities (Lofthouse 2001, 64). Unfortunately, the theory does not specify those risk factors, because each share or portfolio have various extent of sensitivity to any of the risk factors. But few probable factors are: inflation rate, interest rates, business cycle and money supply (Burmeister, Roll, & Ross 2003, 3).

Therefore, the APT formula for expected return is:

$$\mathbf{R_{ft} + \beta_1(R_1 - R_{ft}) + \beta_2(R_2 - R_{ft}) + \beta_3(R_3 - R_{ft}) \ldots + \beta_n(R_n - R_{ft}) + e}$$

β_1, β_2, β_n - security's Beta in relation to the factor
($R_{1,2,n} - R_{ft}$) - risk premium for the corresponding risk factor
e - error term

Since the theory is named as **Arbitrage** Pricing Theory (APT), it assumes that arbitrage can occur, because there exist some imperfections in the markets. The theory states that two stocks with the same sensitivity to economic factors will offer the same return. However, having three assets at disposal and constructing a portfolio with assets one and two, it is possible to achieve that portfolio will have the same beta as the third asset, while offering a higher return. Since the return is higher for bearing the same risk, then arbitrage occurs (Lofthouse 2001, 67).

The Arbitrage Pricing Theory (APT) seems to be attractive because of its complex attitude towards determining the exposure of the return to risk. However, the model also tends to be widely criticized due to the lack of certainty. Since APT does not specify the factors, it is hard for investors to implement it on a daily basis. Investors have to define those risk factors separately for each share, which leads to the ambiguity on whether all the factors were truly tested or some of them were missed. Despite its intuitive simplicity, APT did not receive wide approval because of its main drawback.

2.5 Accounting Based Risk Measurement

Accounting based risk measures have recently been viewed as possible substitutes for CAPM. Practical interest in accounting measures is substantiated by the fact that actual market information is not always available for each company. There might be several reasons for the deficiency of market data: the company might be newly formed, which means that there are simply no past returns to be gathered; company might not be traded publicly and, as a consequence, there is no obtainable market data. In that case there is no other option than to estimate beta from financial statements. Furthermore, CAPM as a model has several crucial drawbacks, which were described above. CAPM inconsistencies lead to the failures in predicting the precise returns, which would also reflect the amount of risk. Several researches have proven that a huge fraction of returns is left unexplained by CAPM (Fama & French 1993, 4). The necessity of the accounting based risk measures was also proven during the recent financial crisis as investors realized that financial markets do not provide complete and reliable information, so that absolute faith in them is unjustified (Toms 2012, 2).

Some researchers argue that firm’s operations and financial activities generate company’s value and, accordingly, risk; that is why accounting results should be taken into consideration for predicting the amount of risk

(Baginski & Wahlen 2003, 328). Thereby, scholars in the fields of finance and accounting express support towards the idea that accounting data enables investors to assess risk more accurate and, hence, make better forecasts concerning the future returns than market information (Burger 2012, 14).

Accounting based risk measures are bounded to CAPM with the only difference that accounting based data is used instead of market returns. While traditional CAPM deals with market betas and expected stock returns, accounting based model implies the usage of accounting betas and accounting rates of return. In other words, accounting betas are calculated on the basis of the accounting stock returns, which are regressed with the market level accounting returns (Helwig & Swinkels 2015, 17). Thus, it is important to differentiate between the terms “accounting beta” and “market beta”, as they have different origins and might even be contradicting. To avoid ambiguity, both of these terms will only be employed indicating the origin of such beta (market or accounting).

The empirical formula for the accounting based calculations looks the following way:

$$(AR_{it} - R_{ft}) = \alpha_{it} + \beta^{A}_{it} * (AR_{mt} - R_{ft}) + U_{it},$$ where

AR_{it} - accounting return for firm i in period t
AR_{mt} - accounting market returns
β^{A}_{it} - accouting beta for firm i in period t
R_{ft} - risk-free rate of return in period t
U_{it} -error term for i in period t
α_{it} - Jensen’s alpha (excess returns)

From the calculations above it is possible to make an inference that accounting beta corresponds to market beta with modification that accounting data is used instead of market.

In order to assess the accounting returns, the following accounting data was used:

- **Revenue** represents total inflow of economic gains from company's operations (IFRS 2011, 1282). Business area of the firm is the main determinant of the type of revenue. Revenue might be expressed as sales revenue, fees, interest or dividends revenue (Benedict, & Elliott 2011, 583). In other words, revenue can be referred to as the earnings of the company.
- **Operating profit** (operating income) is the result from operating activities of the company (operating activities are main operations of the company, which generate revenue) (IFRS 2011, 2909). Operating profit does not include income and expenses from non-operating activities (dividends received, interest payed).
- **Net profit** is the remaining amount after the subtraction of all expenses from gross profit (Benedict, & Elliott 2011, 6). The case when expenses exceed the amount of gross profit, results in the net loss. Net profit specifies the amount allocated for owners.
- **Gross profit** (gross margin) is the amount by which revenue surpasses the cost of goods sold (ibid., 6-7). Gross profit indicates the profit from buying and selling goods solely without considering any further revenues or expenses.
- **Assets** are the resources that company has at its disposal due to the previous events and from which economic gains are anticipated to be received (IFRS 2011, 2874). Only those goods that can be quantified and valued in monetary terms can be called assets. Assets also illustrate the right of ownership of the company.

- **Equity** is the remaining interest in the company's assets after subtracting all the liabilities (ibid., 2888). It illustartes the right of the owners for the part of the business.
- **Debt** is the interest bearing liability. Therefore, debt is part of liabilities, which means that all debts are liabilities. However, not all liabilities are debt, because liabilities are general obligations, which can be expressed in any form, while debt is only money-related obligations.
- **Debt-to-equity ratio (D/E)** is the ratio used for assessing the level of gearing of the company (Benedict, & Elliott 2011, 329). Geared companies are the ones that largely finance their business through selling shares. Geared companies tend to bear more risk due to being highly indebted. Debt-to-equity ratio (D/E) emphasizes the degree to which company employs loans.
- **Earnings per share (EPS)** is the characteristic aiming at providing investors with information on the amount that each equity share will possibly earn. (ibid., 330). Earnings per share (EPS) are viewed as one of the most important features for the assessment of the performance of the share. EPS considered over a certain period of time allow investors to draw conclusions concerning the investment potential of a business entity.

However, the accounting beta is far from being perfect as it also has some drawbacks. First of all, accounting information can only be received from the financial statements of the company; these statements are published on the basis of previous business activities of the company. This means that data from previous periods is used to estimate future outcomes. However, when it comes to the market data, it reflects daily updated information, which is modified in accordance with the expectations of investors. Therefore, it is possible to conclude that accounting data is backward-looking, while market

information is forward-looking. That is why accounting betas might not provide the precise evaluation (Kim 2004, 5).

Second, since accounting data is only published several times per year, it requires the consideration of longer time periods. Furthermore, in contrast with market index, there are no market indexes existing for the accounting returns, which complicates the situation (Burger 2012, 16).

Despite all the disadvantages of the accounting beta, it also has some positive sides. Accounting provides information concerning the real accomplishments of the company, and, thus, it is free from influence of the prejudices and unbiased expectations of investors, which allows to avoid any speculation with betas and expected returns (ibid., 17).

It is important to mention that neither market beta nor accounting beta represent the ideal measurement of future returns. That is why it is of significant importance to figure out which model provides more accurate information.

3 Empirical Literature Review and Hypotheses Development

The importance of a sound literature review for a thorough research can hardly be underestimated. The literature review is one of the most essential parts of the research process that greatly contributes to the logic and the validity of the overall work. First of all, the literature review enables to theoretically justify the conducted study by providing the background information, which is of a great importance to the understanding of the research issue. Furthermore, when it comes to the empirical studies, the literature review provides a connection between previous studies and the current research. It is important to be familiar with the latest studies and discoveries in order to write an up-to-date research, which will be significant and will provide with the applicable outcomes. Empirical literature review

also helps to determine the level of contribution of this research to the existing knowledge developed by scholars (Kumar 2011, 33).

Therefore, on the basis of the theoretical and empirical literature reviews authors specify the hypotheses that will be tested in the research. Black and Champion (1976,126) define a hypothesis as a preliminary estimate concerning the issue that is not yet known. Grinnell (1988, 200) specifies that a hypothesis should either be proved or rejected by the authentic data. Therefore, the study is conducted to pursue such reliable data. More narrowly, the goal of a hypothesis can be formulated as providing a research with a certain focus and improving its overall objectivity (Kumar 2011, 83).

3.1 CAPM: Market Beta

Over the decades since the creation of CAPM researchers from all around the globe examined whether the model is empirically valid. Most of the studies, however, have proven the empirical inconsistency of CAPM and its inability to assess risk and predict returns accurately.

The initial challenge to CAPM was placed with the discovery of anomalies that have an impact on the stock returns. Several authors found out that the market beta in itself is not capable of justifying the returns. Researchers claim that there exist some additional features that have an impact on the overall returns. Among these company-related anomalies are price-to-earnings ratio (Basu 1977, 680), size (Banz 1981, 16-17), sales growth (Lakonishok, Shleifer, Vishny 1994, 1574-1577). In other words, the reseaches concluded that the market beta itself is not suffient for CAPM to explain returns, but there is a need for additional inputs.

Lakonishok and Shapiro (1984, 39) conducted the research with the purpose to examine the relationship between market beta and returns. According to their study, no significant relationship was captured between market beta and returns. The study of Fama and French (1992, 449-450)

examining the multifactor alternative to traditional CAPM has pointed out that during the period 1963-1990 there was almost no valuable correlation noticed between stock returns and market betas. Therefore, this study also rejected CAPM as a predicting tool. From this moment on scholars worldwide started considering that CAPM might be inconsistent with its predictions.

Furthermore, some of the scholars were tempted to illustrate the ambiguity of CAPM. Kothary, Shanken and Sloan (1995, 220-221) ascertained that the usage of the historical market betas that are calculated on the annual basis, rather than on a monthly basis, provides a stronger correlation between market betas and stock returns. Therefore, it can also be specified that CAPM can produce different results for researchers or investors depending on the frequency of data obtainment.

After all of the conducted emprirical tests of CAPM, Fama and French (2004, 43-44) concluded that multiple failures of CAPM in the empirical tests indicate that in most of the cases CAPM as a model can not be perceived as valid.

Despite the prevailing number of studies supporting the inefficiency of CAPM, there are also several researches that indicate the capability of market beta to forecast the expected stock return. A study by Clare, Priestly and Thomas (1998, 1225) examined the UK stock market. It was acknowledged that in the case of the UK market there exists a positive correlation between stock returns and market beta. The other analysis was presented by Elsas, El-Shaer and Theissen (2003, 16-17) on the basis of data received from the German stock market in years 1960-1995. It was also ascertained that there exists positive and significant relationship between market beta and stock returns. Authors claim that their research advocates the implementation of market betas. Berglund and Knif (1999, 38-39) in their study of the Helsinki Stock Exchange have developed a new approach to dealing with CAPM. The researhers have

proposed to employ the time-variablity of market betas in order to make the predictions of market betas more rigorous. Besides that, scholars suggested the accomodation of cross-sectional regressions of abundant returns towards market betas in order to assign greater weights to more credible and trustworthy market beta predictions. Consequenly, this approach resulted in a substantial and positive correlation between market beta and stock returns.

Both studies conducted by Clare, Priestly and Thomas (1998,1225) and by Berglund and Knif (1999, 38-39) are of significant importance to this thesis, as their outcomes are based on the UK and Finland market data, which is also examined in this study.

Notwithstanding the lack of empirical data supporting CAPM implications, it is still highly applicable among university students, professors and investors. There are several possible reasons, why CAPM still remains popular in spite of being widely criticised: there is no other model, which would be significantly more supported in empirical terms; the theoretical rationale of CAPM is intutive, which makes it easy to understand and hard to beat with other more complicated theories; the provided studies with empirical evidence against CAPM are ambiguous and in many cases ambivalent (Jagannathan & Wang 1993, 4). The survey made by Graham and Campbell (2001, 201) revealed that CAPM still remains the most popular approach in estimating the cost of equity capital for financial executives. Among all of the respondents participating in the survey around 73.5% admitted the usage of CAPM as the underlying model.

Taking into account both the failures of CAPM in some empirical tests and its successful performance, it is possible to conclude that the accomplishments of CAPM in general are contradictory. However, due to the wide deployment of this model in the finance area throughout the decades, the theory is mostly accepted rather than rejected by the financial specialists.

Consequently, the first hypothesis implies that CAPM is sound in its predictions and the expected stock returns vary in direct proportion to the market beta. In other words, the market beta is a reliable determinant of the expected returns. The main hypothesis is followed by two sub-hypotheses, which consider the significance of the market beta in the settings of Finland and UK separately.

H1: Market beta positively reflects the effect of market return movement on firm-level stock return on the full sample of Finnish and UK companies

H1a: Market beta positively reflects the effect of market return movement on firm-level stock return on the Finland based firms

H1b: Market beta positively reflects the effect of market return movement on firm-level stock return on the UK based firms

3.2 Accounting Beta

Accounting beta has been widely studied as a possible substitute for market derived beta. The precise research of accounting betas started with the studies by Basu (1977, 680) and Banz (1981, 16-17), who have determined the inconsistencies of market beta by illustrating that company's price-to-earnings ratio and size play an appreciable role in explaining stock returns. Eugene Fama and Kenneth French (1992, 449-450) have later specified that the size of the company has negative relations with stock returns, and, furthermore, such relationship is significant. They have also observed that book-to-market value of equity has the most notable positive relationship with stock retuns.

An appeliing study of 26 years of observations was conducted by Dennis, Perfect, Snow and Wiles (1995, 47-57). The researchers have formed several types of portfolios: first portfolio contained companies with equal firm size, second portfolio included companies with similar book-to-market values. It was noticed that in the case of portfolio one, the stock return

increased as book-to-market value increased. However, in the case of portfolio two, the return decreased as the size increased.

Prior literature in finance suggests that there exist several accounting variables that surpass market beta in terms of foreseeing expected returns. In the research of Barbee, Mukherji and Raines (1996, 59) it was concluded that in the period of 1979-1991 such variables as sales-price, debt-to-equity, book-to-market and size were in positive correlation with stock returns, but the degree of correlation was varying significantly. Out of these variables sales-to-price ratio possessed the most remarkable explanatory power for stock returns. It was infered that sales-to-price ratio can be used as the only trustworthy explanatory agent.

Emerging markets have also attracted a lot of researchers' attention because of their aberrant returns, which scholars were tempted to explain. In the conducted study Mukherji, Dhatt and Kim (1997, 80) have examined several variables and their correlation with returns in Korean Stock Exchange in years 1982-1993. It was proven that returns had an inverse relationship with such variables as book-to-market value, debt-to-equity ratio and sales-to-price ratio. However, negative correlation was noticed between returns and firm's size. In addition, scholars have determined that in case of Korean Stock exchange there was no considerable relationship between market beta and stock returns.

The other remarkable study by Rahmani, Sheri and Tajvidi (2006, 14) is based on the data from the Tehran Stock Exchange. Scholars have acknowledged that there exists notable relationship between stock returns and sales-to-price ratio, earnings-to-price ratio and size. No valuable relationship was observed between market beta, debt-to-equity ratio and stock returns.

In his research Bhandari (1988, 507) has proven the idea that debt-to-equity ratio has a substantial relationship with stock returns. Lam (2002,

163) has also found out that such variables as size, book-to-market value and price-to-earning ratios provided a significant explanation of changes in stock returns.

Cohen, Polk, and Vuolteenaho (2009, 2739) came to the conclusion that accounting beta possesses a substantial explanatory capacity for stock returns and generates smaller errors when measured against market betas.They specify that the longer the analyzed time period, the more accurate the results for accounting beta predictions.

Taking into account the recent studies, it is possible to conclude that on average accounting betas present information that is essential for the accurate risk assessment. Therefore, the second hypothesis states that the accounting beta is reliable in its predicting power and is capable of delivering the precise results concerning stock returns. Two sub-hypotheses specify the role of the accounting betas on the examples of Finnish and UK markets separately.

H2: There exists a positive relationship between the accounting beta and firm stock returns on the full sample of Finnish and UK companies.

H2a: There exists a positive relationship between the accounting beta and firm stock returns on the Finnish market.

H2b: There exists a positive relationship between the accounting beta and firm stock returns on the UK market.

3.3 Relationship between Market Beta and Accounting Risk Measure

A wide variety of studies were conducted in order to assess the predicting power of market and accounting betas and their co-movements. It was noticed that the level of correlation between betas is a subject to changes that depend on the modifications in accounting variables or the length of the period of research (Kim 2004, 4).

Beaver, Kettler, and Scholes (1970, 679) explored the correlation between market and accounting betas. The study examined 307 firms in New York Stock Exchange. The researchers have come to the conclusion that there exists a high level of correlation between betas and that this correlation is substantial. It was noticed that the degree of correlation significantly increased when the analysis was conducted on the basis of a portfolio. The scholars expressed support to the idea that accounting based risk measures provide investors with basically the same information as market based risk measures. This research served as a starting point for further studies in this area. Hereafter based on the assumption presented in the work of Beaver, Kettler and Scholes (1970, 679) researchers were contributing by modifying the amount and set of accounting variables, and period of study.

The study of Gonedes (1973, 407) was aimed at determining whether the research provided by Beaver and colleagues (1970, 679) remained justified. After conducting a regression analysis of 99 firms from New York Stock Exchange, the scientist has come up with the conclusion that there exists statistically valuable relationship between market betas and accounting betas. Ismail and Kim (1989, 125) have carried out the research of 272 firms in the period 1967-1985. The study also examined several income variables. It was revealed that there exists a substantial relationship between market and accounting betas (with all four income variables).

Furthermore, Beaver and Manegold (1975, 263-265) have pointed out the statistically substantial connections between some accounting variables and market beta. They have also indicated that correlation between betas is influenced by the duration of the sample period. This means that longer research period leads to higher level of correlation between market and accounting betas. Elgers and Murray (1982, 358) explored the dependance of the accounting betas from the choice of the market index.

They have found out that there exists a significant influence of index on the final accounting beta results.

One of the latest studies in this field was conducted by Jarvela, Kozyra and Potter (2009, 8), who aimed at re-examining the famous study of Beaver, Kettler and Scholes (1970, 679) in order to figure out whether the results are still valid four decades later. In order to conduct this study, 222 listed companies were taken as a sample. The relationships between accounting variables such as dividend payout ratio, leverage, earnings variability, and market beta were explored. It was ascertained that the results of 1970 still remain reliable in the modern times and there exists positive correlation between market beta and accounting based risk measures.

However, there have also been some opposing views concernig the level of correlation between market and accounting betas. For example, the study conducted by Changwan Kim (2004, 13) examined the relations between market and accountig betas on the example of highly leveraged firms. It was ascertained that there is no co-movement between market and accounting betas, which means that the relations between both betas are very weak. Moreover, Nekrasov and Shroff (2009, 1983) also demonstarted that accounting beta is a better explanatory mechanism for future returns than market beta.

However, the majority of recent studies suggests that both betas provide valuable and often similar information for a precise assessment of returns.

The third hypothesis formulated for this study claims that there exists a positive relationship between market and accounting betas and, therefore, both of them are significant in predicitng firm stock returns. Two sub-hypotheses describe the association between the betas in relation to Finnish and UK markets.

H3: Market beta and accounting beta are positively associated on the full sample of Finnish and UK companies

H3a: Market beta and accounting beta are positively associated on the Finnish market.

H3b: Market beta and accounting beta are positively associated on the UK market.

4 Methodology

Kothari (2004, 8) defines the research methodology as a technique, which assists the researcher in successfully resolving the research problem. More specifically, it can be determined as the way of how the research was conducted from a scientific standpoint. Methodology specifies the common steps that were implemented by the researcher in order to solve the research problem and the consistency behind those steps.

Saunders, Lewis and Thornhill (2009, 106) claim that the research philosophy represents one of the major parts of a thorough methodology. They define research philosophy as the structure of knowledge development and its nature relative to the research (ibid., 600). Positivism is the research philosophy employed in the current study. Positivism implies that only the observable part of reality is examined leading to the creation of a credible and trustworthy outcome (ibid., 601). Exisitng theories are used with the purpose of elaborating hypotheses. Furthermore, a positivistic philosophy is applicable in the case of this thesis because it allows the researcher to remain unbiased, independent and objective; there is no way the researcher can unintentionally affect the outcomes of the study. In the case of a positivistic philosophy, the cause and effect way of thinking is prevailing; the data collection is expected to be highly structured leading to a statisctical analysis of the gathered variables (ibid., 116).

The choice of the research approach is justified by the research philosophy. The deductive approach is deemed to be of high significance for this study. Such approach is mainly based on the usage of pre-developed theory. Hypotheses are formulated by the researcher in order to test the existing theory (Creswell 2009, 5).

4.1 Research Design, Strategy and Process

Kumar (1999, 74) defines the research design as a plan, describing certain conditions related to data collection and analysis, which is implemented in order to answer the research questions effectively. To define the research strategy accurately, the distinction should be made between quantitative and qualitative nature of the research, or in some cases mixed methods approach.

Bryman (1988, 94) have clearly explained the distinction between qualitative and quantitative research: qualitative research mainly deals with measuring and assessing attitudes of the respondents, their thoughts, beliefs and values. In this case the researcher is trying to gain some inside knowledge and undestanding of the problem in order to get more detailed information about the examined phenomenon (ibid., 94-95). The research in general does not possess any structured characterisitcs. However, quantitative research deals in a greater extent with theories, trying to prove or reject their validity in a highly structured way. The researcher conducting quantitative research remains remote from the subject of the study. The quantitative research is inevitably related to the positivistic research philosophy, as it claims the existence of objective reality, which is possible to assess in numerical way. Quantitative research explores the relationships between variables with the implementation of various statistical methods (Saunders, Lewis, & Thornhill 2012, 162). Therefore, for the current thesis quantitative research was chosen as the only suitable type of research allowing to test theories numerically and to trace the relationships between variables.

The purpose of this study is to explore whether market beta represents the trustworthy determinant of stock returns, whether accounting beta is capable of predicting stock returns and whether accounting and market betas provide equally valuable information for investors concerning stock returns. In other words, the purpose of research is to figure out if there exist positive relationships between market beta and stock returns, accounting beta and accounting stock retuns, market and accounting betas. Thereby, the research is of explanatory nature. Saunders and colleagues (2012, 172) specify that explanatory studies are aimed at establishing relationships between variables. In this research the problem is adressed by determining the significance of relationships between variables.

4.2 Data Collection Methods

The secondary data was obtained with the purpose of answering the research questions and meeting the objectives of the study. Walliman (2005, 242) defines secondary data as the type of data, which is a subject to interpretation. Secondary sources represent data that was initially collected for some other purpose. It can be a subject to further analysis by the researcher himself in order to obtain new interpretation and outcomes (Saunders, Lewis, & Thornhill 2012, 304). On the first stage of the research, the secondary sources of information were used in the theoretical framework of this thesis allowing the readers to familiarize with the topic of the research. The main source used for this purpose was academic reading. Empirical studies were the subsequent source of the secondary data, which enabled the critical assessment of the researches that were conducted in this field. Empirical studies mainly refer to the journal articles in the field of economics and finance, various publications and reports. The chosen studies are widely renowned as the ones contributing to the development of theories in the sphere of risk assessment. Their validity and trustworthiness are acknowledged among scholars.

The numeric data obtained was also extracted from secondary sources. Saunders and others (2012, 307) refer to this type of secondary data as a raw data, which requres further analysis. The raw numeric data was mainly used at the stage of determining the returns of each company and market as a whole. The numeric data was acquired from the companies located in Finland and UK.

In the case of Finland, a list of all publicly traded companies was found at the Nasdaq OMX Nordics web-site. This web-site contains information concerning the historical prices of the shares of all publicly-traded companies in Finland. The time frame used for the analysis is the five-year period from 1st of January 2010 until 31st of December 2014. Each company's historical prices were extracted on a daily basis during that five-year period and converted into an excel spreadsheet. Then with the help of the historical share prices data, the daily stock returns (Rit) were calculated according to the following formula:

$$\textit{Stock return (Rit)} = (\textit{Closing Price}_{\textit{current day}} - \textit{Closing Price}_{\textit{previous day}}) / \textit{Closing Price}_{\textit{previous day}}$$

Thereby, return on the company's share (Rit) for each day throughout the year was determined. The same procedure was conducted on a yearly basis for five years altogether for companies on Finnish market. Then the average annual firm's stock return was calculated using the excel formula (= AVERAGE). The data on the Average Annual Market Returns (Rmt) was also extracted from Nasdaq Nordic Web-site.

Nevertheless, considering solely stock returns (Rit) and market returns (Rmt) for this research is mistakenly. This is due to the fact that when having a closer look on each type of returns, it is possible to recall that traditional CAPM formula implies subtraction of risk-free rate of return (Rft) from stock (Rit) and market returns (Rmt). Furthermore, in order for stock (Rit) and market returns (Rmt) to be appealing, they should exceed the

returns on a riskless investment. Thus, the risk-free rate of return on investment (Rft) should be deducted from return on stocks (Rit) and market (Rmt) in order to figure out to what extent investing in stocks is more profitable than investing in government bonds. On the day when such information was obtained, risk-free rate of return in Finland was equal to 0,83%. Such information was obtained from the Trading Economics web-site. In order to be able to subtract this number from stock and market returns, it should first be translated to a number without the percentage sign by diving 0,83% by 100. So the final number representing Finnish risk free rate is 0,0083. By subtracting this number from the column with firm stock return and average annual market return, the data needed for CAPM model is received. Thus, the newly obtained stock returns are (Rit-Rft) and market returns are (Rmt-Rft).

In the case of UK stock market, index FTSE 250 was taken as a benchmark. This index is comprised of 250 biggest UK companies. The data on these companies was extracted from UK Yahoo Finance web-site. The procedure of calculating stock returns was exactly the same as with Finland: first excel data on average stock prices for the period of one year was downloaded, then daily stock returns were calculated with the usage of the formula described above, and the last step was the calculation of average annual firm's stock return with built-in excel formula (=AVERAGE). The data on the Average Annual Market Returns was also taken from Yahoo Finance web-site. The risk free rate on investment in UK government bonds at that time was 1,80%. The Trading Economics is the web-site, where such information was retrieved from. The final number subtracted from stock and market returns equals to 0,018. After subtracting this number, there appear two more columns representing average annual firm stock return (Rit-Rft) and average annual market return (Rmt-Rft). These are the variables that are required for the CAMP model.

According to Saunders and colleagues (2012, 307), there also exists another type of secondary data, which can be refered to as compiled data.

This type represents data, which has already gone through some kind of processing, or summarising. In this thesis complied data represents information extracted from companies' financial statements: income statement and balance sheet. The finanical statements were accessed on the companies' websites and present official information concerning business activities of firms. These financial statements allow to determine and calculate the accounting variables, which are used in assessing market and accounting betas. This secondary data was manually written for each company separately on a yearly basis throughout the five-year period. The data withdrawn from the financial statements of both Finnish and UK companies includes: annual sales revenue, annual operating profit, annual assets, annual equity, earnings per share, debt.

However, not all of the acquired data can be directly used in the research. Some modifications were also done in order to meet the requirements of the regression analysis. Due to the fact that considered markets vary greatly in terms of size and level of development, it is important to keep in mind that the usage of ratios in that case is more appropriate than the direct usage of extracted numbers. The size of the company would no longer affect the final results, as only relative data is taken into account. Convertation into ratios helps to avoid ambiguity and ensure the authenticity of the outcomes and objective comparisons.

Some variables were modified keeping in consideration the limitations on the availability of data. Final accounting variables considered in the current study (including modified) are:

- **Operating Profit to Sales ratio**: for the current thesis it was decided to implement the operating profit figures, which would reflect changes over the time with regard to the sales revenue. In this case it is possible to trace whether there exists a consistent pattern. In other words, this ratio helps to estimate the amount of profit generated from sales. Operating profit to

sales ratio can also be named as operating margin or return on sales (ROS). For the market based risk measure this variable will be used as additional input for the estimation of market beta. However, in accounting based risk measurement this variable will play the role of the accounting stock return (ARit). This variable is analogous to the firm stock returns (Rit) taken from market data. It was determined in accordance with the following formula:

Operating Profit to Sales Ratio= Operating Profit / Sales Revenue

For the accounting based risk measure risk free rate (Rft) should also be deducted from this figure resulting in accounting stock return (ARit-Rft).

- **Operating Profit to Assets ratio**: such type of ratio represents the relative profitability of the company with regard to its assets. It will further be utilized in the calculations of the market level accounting returns (ARmt). The ratio was calculated in comformity with the following formula:

  Operating Profit to Assets Ratio= Operating Profit / Assets

- **Operating Profit to Equity ratio**: this ratio reflects operating profit that is connected to the equity of the company. In other words, it assesses profit generated from operations with the money provided by shareholders. The calculation of market level accounting returns (ARmt) will require information gained with the help of this ratio. It is calculated according to the formula:

  Operating Profit to Equity Ratio= Operating Profit / Equity

- **Market Level Accounting Return (ARmt)**: is the variable illustrating the average accounting return on the whole market. This is similar to the market return (Rmt) with the consideration of market data. However, due to the fact that there is no accessible data on the accounting returns of the market, the

calculations were conducted manually. The created proxy represents a metrix of several variables: operating profit to sales ratio, operating profit to assets ratio, operating profit to equity ratio. It was decided to figure out the average of these numbers in order to receive the representative data concerning the market level accounting returns (ARmt). Due to the fact that there exists several types of averages, it was decided to implement median for the calculations. Median value was considered because it illustates the middle value of the dataset and, as a result, more representative. Furthermore, median is less affected by the exteme numbers than mean. Generally, the usage of median for this research helps to make it more objective and trustworthy.

Market level accounting return (ARmt) is calculated as the median of operating profit to sales ratio, operating profit to assets ratio, operating profit to equity ratio on the annual basis for the 5 year period of time.

Average market level accounting performance= MEDIAN (Operating profit to sales; Operating profit to assets; Operating profit to equity)

However, risk-free rate should be further deducted in order to fulfull the requirements of the accounting based risk measure calculations. Thus, in correlaiton and regressions analyses the market level accounting return is represented by (ARmt-Rft).

- **Log of Sales**: the logarithmic formula was taken from the sales revenue data. Such modification is required in order to avoid linearity. Linearity results in the predictability of the outcomes. However, for the research purposes the results should be unbiased and, thus, logarithmic transformation is implemented. As the result, the betas will remain efficient and objective.

Log of Sales= Log (Sales)

- **Log of Assets**: logarithmic formula of assets was taken due to the same reason as logarithmic formula of sales. It enabled to make nonlinearity and ensure trustworthiness of the final outcomes.The formula for calculations is as follows:

  Log of Assets= Log (Assets)

- **Earnings per share (EPS)**: earnings per share is the variable that was directly extracted from financial statements. It illustrates the amount of money allocated to one share. In other words, it helps to assess how much money can investor earn from owning a share of the company. EPS is in an important indicator for potential investors and, therefore, associated with stock returns. As a result, this variable is widely used in calculations of accounting beta.
- **Debt-to-equity ratio (D/E ratio)**: D/E ratio was chosen to be considered for this thesis due to the fact that such ratio illustrates the most important information concerning the company's activities: its level of leverage. Therefore, this variable tends to be considered of a crucial importance for risk assessment. A lot of studies described in empirical literature chapter claim that there exists a positive correlation between debt-to-equity ratio (D/E) and stock returns. Debt-to-equity ratio (D/E) was calculated with the usage of following formula:

  Debt-to-equity ratio (D/E) = Debt / Equity

4.3 Sampling

Kumar (2011, 193) defines sampling as a method of choosing few representatives (a sample) from a larger group (sampling population) to serve as the starting point for assessing or forecasting the prevalence of the obscure information or result concerning the larger group. Walliman (2005, 276) specifies that in the case of the research the word 'population' does not necessary refer to some people. This term covers the aggregate quantity of the cases in the conducted study.

The current study aims at analyzing the relationships between the market beta, accounting beta and stock returns (market and accounting respectively) in the example of Finland and UK. Therefore, the total population was limited to the Finnish and UK listed companies, whose shares are publicly traded. The initial population of the Finland based companies was 137, and the total population of the UK companies was 250. Multi-stage sampling techniques were implemented in order to determine the samples that would meet the requirements of the research.

At the first stage of the sampling process, stratified random sampling was chosen. Saunders and colleagues (2012, 276) interpret this type of random or probability sampling as a method, in which the population is separated into several stratas based on distinct characteristics. In the subsequent step, the random sample is taken from each of the stratas. The main advantage of this method is that stratified random sampling enables sample to be highly representative because a sample is withdrawn from each of the stratas. In the case of Finland and UK, the companies in both markets were first divided into manufacturing and non-manufacturing ones in order to ensure that companies considered in this research represent different industries and that each of these subgroups is proportionally represented in the sample. However, because of the unavailiability and inconsistency of certain data from the companies representing the financial sector, they had to be excluded from the reserch. It was concluded that the elimination of the financial sector companies from the research would benefit this study by helping it to remain consistent. Thus, the sample was reduced to 71 Finnish and 129 UK companies.

At the second stage of the sampling process, it was decided to implement non-probability sampling. Non-probability sampling is identified as a sampling method, in which the chance of picking up each of the cases is not known (ibid., 676). This techniques was chosen due to its convenience in implementation. At this point the classification was made on the basis of data availability. Because the project deals with data obtained from

databases and manually hand written secondary data from financial statements, there is a need to figure out whether all the required data is easily accessible for the companies from both the manufacturing and non-manufacturing sectors. Nevertheless, it was noticed that some of the companies do not provide enough information covering the periods considered in this reseach, also several important variables were missing from the financial statements of the companies. Consequently, the samples had to be further shortlisted. The final sample consists of 140 companies, of which 60 are Finnish based and 80 are UK based. When it comes to the UK, it was ascertained that the UK market is bigger than the Finnish, and, consequently, taking the same number of companies as in Finland would result in an ambiguity of the outcomes. In that case the data would no longer remain a fair representation of the UK Stock market and its accuracy could be questioned.

The multi-stage approach in sampling is believed to be beneficial for this study as it covers companies from various business sectors while helping to remain consistent in choosing only those firms, which provide all the necessary data for this research project. The size of the sample is considered to be large enough to provide trustworthy outcomes and contribute to the significance of this thesis.

4.4 Analysis Methods

The analysis of the obtained data was conducted with the help of the statistical tool called SPSS software. On the first stage, data was organized in the separate EXCEL spreadsheets depending on the year. On the next stage dependent and independent variables were assigned. First, variables were determined for the case of calculating market data. Andy Field (2009, 7) defines independent variable as the one that is perceived to be the cause of some phenomenon. The dependent variable is determined as the variable that is influenced by the changes in independent variable.

For the market model, firm stock returns (Rit-Rft) is dependent variable, and market returns (Rmt-Rft), operating profit to sales ratio, log of sales, log of assets, earnings per share and debt-to-equity ratio are independent variables. In other words, it is examined to which extent changes in independent variables lead to changes in stock returns. Such independent variables as operating profit to sales ratio, log of sales, log of assets, earnings per share and debt-to-equity ratio are chosen as control variables. These variables can help in assessing the external powers that might have an impact on the dependent variable. Control variables reflect the outside effect on the final outcome. In the case of accounting beta, the dependent variable is average annual operating profit to sales ratio, which represents the accounting stock return (ARit-Rft). Independent variables are market level accounting return (ARmt-Rft), log of sales, log of assets, earnings per share and debt-to-equity ratio. These variables were transferred to SPSS programme. This statistical tool was chosen to be the major analysis technique in this research due it its simplicity, user-friendliness and informational content. The programme is well structured, easy to learn and provides the researcher with a wide variety of useful methods and applications for analysis.

The conducted research assumes performing both descriptive and inferential analysis. Descriptive statistics refers to the type of data analysis that enables researcher to summarize information concerning the variables. It provides a deeper insight into the nature of the variables.

The output of descriptive statistics provides information concerning the number of observations, minimum number, maximum number, mean and standard deviation of the examined variables. Minimum and maximum values indicate lowest and highest numbers among all the cases. Mean represents the arithmetic average value. In other words it can be defined as sum of all the values divided by the total quantity of those values (George & Mallery 2006, 98). Standard deviation provides the assessment of the average variability of the data. It describes how far the data deviates from

the mean. Such statistics provides the resercher with a practical overview of the dataset and the knowledge concerning dispersion. The data is represented in a form of a table, where variables are located in the rows and descriptive statistics is arranged in columns.

The inferential research types chosen for this thesis are correlational research and multi-variate linear regression. Correlational research helps to conduct a thorough analysis of relationships between several variables (Joyner, Rouse, & Glatthorn 2013, 76). The correlation between variables will be numerically assessed and analyzed with the help of statistical techniques. According to Nicholas Walliman (2005, 117) correlation research can be divided into two sub-groups: relational studies and prediction studies. Relational studies refer to the exploration of relationships between variables to determine whether the correlation really exists and what is its extent. These studies are generally carried out in cases when a little or no previous studies were conducted or in case if the correlation still remains unclear after several researches. Prediction studies are employed when the correlations are successfully established (ibid., 117-118). Knowledge of relationship between variables in the past serves as a basis for future predictions.

However, in the case of current research both subtypes will be introduced. First, on the basis of previous studies the hypotheses were formulated and, therefore, these hypotheses will be tested whether the research provides similar outcomes to those of previous studies. Hence, prediction studies are the ones that play a significant role in that case. Furthermore, accounting risk measurement is a relatively new branch in finance and, as a result, there is still a lot to be researched. Several accounting variables are taken into consideration in this research, which were not that widely implemented in previous studies and, as a consequence, there is a need to examine the relationship by doing relational studies.

Correlational research has several advantages compare to other types of research that are of a cruicial importance for this thesis: it helps to determine the measurement system of the variables used and direct relationships between them; it allows to figure out the exact extent of the correlations between examined variables and, thereby, to determine the level of accuracy of the outcomes (ibid., 117).

Linear regression analysis is further carried out on the basis of the obtained data. The type of regression used is a multiple regression. This method implies that the dependent variable should be predicted from few predictor (independent) variables (Field 2009, 198). In other words, multiple regression enables to assess the degree of influence of several variables on the dependent variable. It also provides information concerning the amount of changes in dependent variable that are caused by the changes in independent variable.

The miltiple regression formula used for this study is following:

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + B_n X_n + \varepsilon,}\ \text{where}$$

Y- dependent variable
β_0- Y intercept, constant
$\beta_1, \beta_2 \ldots \beta_n$- coeffcient of predictor (regression coefficient)
$X_1, X_2 \ldots X_n$- predictors (independent variables)
ε- error term

In this case regression coefficients of each predictor provide information concerning the amount of power that such predictor imposes on the dependent variable (Hanneman, Kposowa, & Riddle 2013, 470).

The method chosen for the regression that fits this research is stepwise method. This complex method implies that the variable that has lost its predicting power will be removed. More specifically, it is possible that variance, which was explained by specific variables, might change once

new variables appear in the equation. As a result, all of the rebundant variables are removed from the equation (George & Mallery 2006, 197).

Field (2009, 49) describes the inferential statistics as the type of analysis, which provides an opportunity to define relationships between variables, generate predictions and inferences and, consequntly, test the hypothesis. On the basis of this type of statistics researcher can determine whether the predictions are valid or should be refuted.

The conducted regression and correlation will provide several outputs, among which are: correlations, model summary, ANOVA, coefficients, collinearity diagnostics, residual statistics. However, for this research only few of these outputs will be analyzed in more detail. Correlation output and coefficients output are the ones that will be considered in this thesis. Both of these outputs refer to the inferential statistics.

Correlation helps to assess the existence of linear relationships between variables. The correlation output contains information concerning the Pearson's correlation coefficient and the significance of these correlations. The correlation coefficients might take a value from -1 to 1 depending on the strength of the correlation. Positive correlation demonstrates that there exists a positive relationship between variables and the growth in value of one variable leads to growth in value of related variable. The closer the value to 1, the stronger the correlation between variables; and the closer the value to 0, the weaker the relationship. Negative correlation shows negative relationship between variables, when the growth of one leads to reduction of another (SPSS: Descriptive and Inferential Statistics 2012, 15). The table also contains information concerning the significance of these correlations. George and Mallery (2006, 96) specify that the value less that .05 is generally perceived as statistically sighificant. However, whenever the significance is between .05 and .10, it is viewed as marginally significant. The general rule states that the smaller number of the significance level, the higher the confidence level of the researcher in the outputs. For this thesis

in the cases when the significance level of correlation is no more than 0.1, the correlation will be deemed as significant. In the research process, finding the result is a minor issue since this result should also be considered significant in order to be valid and trustworthy.

Coefficients output depicts the estimated regression equation and its parameters. This output provides several statistical options for further analysis, but only unstandardized coefficient (Beta), t-test, and significance level will be considered in this research. Unstandardized beta coefficient represents the regression coefficient, which meaures the level of individual contribution of each variable to the model as a whole. Such coefficients are crucial for understanding and exegesis of the regression model. Beta coefficient reflects the relative increase (decrease) in dependent variable that was initiated by the increase (decrease) in independent variable. In other words, beta assesses the relationships between each of the independent variables and dependent variable. Whenever beta is a positive number, then there is a positive relationship, but if beta is negative, then the relationship is also negative. Furthermore, beta also indicates the corresponding importance of each variable in the equation. The t-test is implemented when there is a need to determine whether there exist statistically significant distinctions between the means of two groups (Cohen, Manion, & Morrison 2007, 543). In general, both t-test and significance level examine whether the independent variable is significant for the final outcome. In case, when the t-value is viewed as significant (significance level is less than 0.1), then it can be concluded that the variable is substantial and contributes greatly to the model (Foster 2001, 216). The data on the inferential statistics is also presented in a form of tables, allowing for a better comparison between values. Variables are located in the rows and the statistical measures are arranged in columns.

4.5 Validity and Reliability

Several approaches exist in the research process in order to measure the quality of the conducted research. To remain credible, the study should meet the requirements of validity and reliability. Jonathan Wilson (2010, 308) defines validity as the degree to which a measure precisely assesses the notion that it is supposed to assess. Validity deals with the issues of appropriateness and precision. There exists several types of validity. However, the ones applicable to quantitative research are internal and external validity.

The external validity represents the degree to which the outcomes of the research can be generalized to a broader population. Wilson (2010, 119) provides an outstanding classification of internal validity, which can be divided into content and construct validity. Content validity deals predominantly with the fullfillment of its obligations towards covering the areas of the study, which it initially was supposed to examine. The content validity represents the correctness and sophistication of the measure. The construct validity mostly refers to the area of statistics, where it deals with the issues of the comparing the input of each variable to the total variation of the model (Kumar 2011, 180).

In order to ensure the validity of the current study, several strategies were implemented. To avoid the external invalidity, the sampling procedure was conducted in several stages. This approach made it possible to specify the representative sample that would correspond to the general population. The chosen companies from Finland and UK represent various business sectors of these countries, thus, helping the samples to remain consistent and resumptive. Furthermore, to promote the external validity of the research and avoid an obscure designation of variables in the study, previous studies in this field were taken into consideration; the variables were determined in a way that would help in reiteration of this research. To avoid the dependance of the results on time and make it possible to guarantee that

the examined pattern takes place over time, it was decided to conduct a study over five-year period of time. This way there is more confidence that the outputs of the research could be repreated after some time concerning the examples of both examined markets.

The internal validity also poses a threat to research. In order to guarantee the internal validity of the study, it was decided to implement a proxy based on the metrix of accounting measures, such as an operating profit to sales ratio, an operating profit to assets ratio and an operating profit to equity ratio.The metrix approach was chosen because taking measures of accounting performance on the market level simply as the average of accounting returns on companies' level throughtout five year period would lead to those results being linear and, thus, not reliable. Also, the calculation of the market level accounting return (ARmt-Rft) was conducted through a median rather than a mean. It was decided to avoid the usage of the mean because in that case the numerical value of the dependent variable would also appear in the independent variable. Thus, measuring problems might appear and, as a consequence, betas could be biased. The median value, on the contrary, enables getting the middle value, which is more representative. The median does not let the extreme numbers to affect the middle value and allows for achieving an unbiased beta. Furthermore, considering a highly structured quantitative approach of the study with the usage of secondary data, it is possible to avoid additional threats to validity that qualitative research bears, to name a few: drops in the number of participants, changes in the participants etc.

Cohen and colleagues (2007, 146) specify that there exists a difference between reliability in quantitative and qualitative research. According to the scholars, reliability in the quantitative research refers to such concepts as trustworthiness and coherence. In order to avoid the time errors that might negatively affect the reliablity of results, the data was withdrawn using equal periods both for market and accounting measures. It means that the market returns were calculated on the daily basis summing up the total of one year,

five year periods were examined. In the case of the accounting information, the data was collected on an annual basis for the same period of five years. The observer influence was also minimized as the conducted study represents quantitative research with the usage of secondary data. Therefore, there was no direct intervention of the researcher during the research process, and the data collection was highly structured, which helped the researcher to remain unbiased.

5. Research Results

The outcomes of the study are divided into several subgroups, such as descriptive statistics, inferential statistics correlation and inferential statistics multi-variate regression. Such division enables to observe the results from various perspectives and provides a deeper insight in the patterns of the datasets, thus, leading to a more cogent and profound analysis.

5.1 Descriptive statistics

In order to form the basis for further analysis, it is important to have a closer look on the descriptive statistics, which contains information on the most basic features of the examined dataset. The descriptive statistics is analyzed from three perspectives: descriptive statistics concerning the Finnish market, descriptive statistics concerning the UK market and descriptive statistics concerning the full sample of Finnish and UK companies combined. It is important to mention that in the descriptive statistics for Finland, UK and for the full sample of companies from both countries such variables as market return (Rm-Rft), stock return (Rit-Rft), market level accountinting return (ARmt-Rft) and accounting stock return (ARit-Rft) will be considered without the deduction of the risk-free rate (Rft). For the purpose of equitable reflection of the main features of the variables, their initial form was taken into account, rather than the modified version, which will be used further for correlation and regression analyses. In other words, only the returns exclusively will be taken into account without any

adjustments for the risk-free rate (Rft). Therefore, the variables for descriptive statistics look the following way: market return (Rmt), stock return (Rit), market level accounting return (ARmt), accounting stock return (ARit).

When it comes to the data form the Finnish market, there exists several patterns that are easily observed. First, market variables are assessed (see Appendices 1-6). Appendix 19 provides graphical information on the market return. Throughout the five-year period of observations, the mean of the market return remained stable and did not change significantly. However, the standard deviation was fluctuating more actively by increasing in years 2010 and 2011, and then rapidly decreasing in subsequent years 2012 and 2013. The certain tendency might be observed in the standard deviation movements, as in year 2014 it has started growing once again. In the meantime stock returns show greater variability of mean results compare to market return (see Appendix 20). The downward movement in the beginning of the observed years was later substituted with the upward growth. However, in year 2014 mean of stock returns started declining again. Smaller changes in the mean values of market return when compared to stock returns are due to the fact that market consists of various companies, whose returns outweigh each other, thus leading to smallller total changes.The standard deviation of stock return was more stable and consistent than the one from market returns. It showed constant growth starting from year 2011. Despite the negative trend in the mean values of stock and market returns in years 2013 and 2014, there surprisingly exists a positive growth in earnings per share in these years (see Appendix 21). In earnings per share figure both mean and standard deviation follow similar pattern in constant growth throughtout the period of observations.

The accounting based variables are described separately from market variables in order to make a distinction between the nature of these variables (see Appendices 1-6). The descriptive statistics for the average annual operating profit variable for Finnish companies illustrates that while

mean was fluctuating downwards from years 2011 to 2013, the standard deviation was moving upwards in value in years starting from 2010 to 2012 and decreasing in year 2013 (see Appendix 22). However, both of the features showed the tendency towards growth in year 2014. Both mean and standard deviation of the total sales variable shared equal characteristics by moving downwards during the five-year period (see Appendix 23). The mean of the net profit of the Finland based companies remained stable, without any rapid fluctuations and showed a slight trend towards moving up in value (see Appendix 24). However, the standard deviation was much more dispersed. The standard deviation of net profit variable was changing its direction of movement several times throughout the analyzed period. The four variables share the common characteristics and will be discussed together due to their tight connections with each other. Both mean and standard deviation of such variables as assets, equtiy, liabilities and debt do not fluctuate significantly and decline during the whole period (see Appendices 25-28). One possible reason for such group downshift is that the decrease in sales forced companies to use their assets and shareholders' equity to cover the liabilites and debts associated with firms. Therefore, debt and liabilites were redeemed at the expense of assets and equity. Accounting variables that correspond to market return (Rmt) and stock return (Rit) are market level accounting return (ARmt) and accounting stock return (ARit). However, as was described above, in order to maintain just examination of the variables and get cogent outcomes, such accounting variables will also be considered without the deduction of the risk-free rate (Rft). Both mean and standard deviation of these accounting variables, in spite of slight variability, remain consistent and fairly stable during the five-year period (see Appendices 29-30).

The market data on the returns in UK provides similar information to that of the Finnish market (see Appendices 7-12). The mean of the market returns does not disperse significantly, while the standard deviation vary greatly by changing the direction of its movement several times (see Appendix 31).

The common trend for these indicators is slight increase in the recent years. The stock return variable has a greater fluctuation in mean values rather than in standard deviation values (see Appendix 32). Despite the fact that both of these variables grow and decrease over the time, the general tendency states that from year 2013 there has been a downward movement in values. Furthermore, the earnings per share variable has mean and standard deviation that almost coincide at every period of observation (see Appendix 33). They also share a common feature of stability and low rates of volatility. The earnings per share, in contrast to Finland, were also a subject to negative changes in the case of UK. Such negative trend in earnings per share is explained by the accounting information. It can be inferred that in the same years, when earnings per share figures declined, average annual operating profits and net profits decreased as well, while the amounts of debt and liabilities were growing.

The accounting based variables of the UK market provide essential information for the general overview of the patterns that have occurred in the UK companies in five-year period (see Appendices 7-12). The mean and the standard deviation of the average annual operating profit and net profit reflect balanced movement with a slight tendency towards growth (see Appendices 34,36). No significant fluctuation is observed in these values. Opposing to the Finnish market, where total sales variable was decreasing, the mean and standard deviation of the total sales in UK remain stable over time (see Appendix 35). One of the most remarkable things that distinguishes Finnish and UK markets are such variables as assets, equity, debt and liabilities (see Appendices 37-40). It was described above that in Finnish market the general tendency for these variables was downward movement. However, in UK all of these variables show upward growth. In other words, the means of the assets, equity, debt and liabilities are growing, while standard deviation is stable. One possible explanation for such phenomenon is that UK companies take additional debt and liabilites on themselves, thus, increasing the volumes of assets and equity. The

standard deviation and mean of the market level accounting return are relatively stable and have a common trend towards declining (see Appendix 41). Consequently, the mean of the accounting stock return follows the same pattern and slighly moves downwards(see Appendix 42). The standard deviation and mean of accounting stock returns vary even less than the same feautures of market level accounting returns.

With respect to the overall sample of Finnish and UK companies (see Appendices 13-18), the standard deviation of the market returns can be described as volatile, as the periods of growth were substituted by the periods of decline (see Appendix 43). In that respect, the mean values are less dispersed. The mean value of stock returns, on the contrary, fluctuates much more significant, while the standard devaition is almost unaltered during the five-year period (see Appendix 44). The common tendency for these variables is downward movement. The mean and standard deviation of earnings per share variable also stay constant without any significant fluctuations (see Appendix 45). The values slighly increase over the time.

Considering the accounting variables, both mean and standard deviation of average annual operating profit are not greatly dispersed (see Appendix 46). The remarkable feature in that case is that while the tendency of mean value is downward movement, the standard deviation is moving upwards. The mean values of the total sales and net profit, remain growing until year 2012, and then show declination in the subsequent years (see Appendices 47-48). It is ascertained that the mean values of assets, equity, debt and liabilities are growing during the period of observation (see Appendices 49-52). The most probable justification of this phenomenon might be that the total sample consists of both Finnish and UK companies, where UK based firms outpass Finnish firms in quantity. Hence, the prevailing amount of UK companies forces the total sample results to have similar outcomes. The variables analogous to market return (Rmt) and stock return (Rit) in accounting settings are market level accounting return (ARmt) and accounting stock return (ARit). Mean and standard deviation of these

variables stay almost unaltered during the five-year period of analysis (see Appendices 53-54). Possible explanation of such stability is that the results of accounting returns in Finland and UK balance each other out, thus, leading to a more invariable outcomes.

5.2 Inferential statistics: correlation

The correlational tables define the degree of association between two variables. Separate correlational tables were created to represent relationships between variables for market based risk measure (CAPM) and accounting based risk measure. In the correlation and multi-variate regression analyses the variables representing the returns on both market and accounting levels will be considered with the adjustments towards the risk-free rate (Rft). Thus, the market return (Rmt-Rft), stock return (Rit-Rft), market level accounting return (ARmt-Rft) and accounting return (ARit-Rft) are examined below as well as other market and accounting variables.

In the case of Finland, market model states that there exists a significant degree of correlation between stock return and operating profit to sales ratio; and between stock return and earnings per share throughout the five year period (see Appendices 55, 57,59, 61,63,65). Such strong relationships can be explained by saying that operating profit to sales ratio reflects the efficiency of the firm in its operations, thus, there exists a strong and positive relationship between the company's performance and amounts of return on the stock. Furthermore, earnings per share figure illustrates the part of firm's earnings that refer to a single share. It illustrates the levels of profitability of the company in general and the particular amount of earnings that is distributed among the shares. Large earnings per share figure provides potential investors with information that company is profitable in its activities and there exists a positive tendency towards growth. In that case investors would strive to buy the shares of this company forcing the share prices to grow. Hence, higher earnings per share figure lead to higher stock returns. The correlational table also indicates the existence of negative

relationship between stock return and debt-to-equity ratio. Highly indebted companies traditionally have lower credibility rates due to bearing the risk of default. The share prices of such companies normally do not grow that rapidly. Consequently, the higher the debt-to-equity rates, the smaller the stock returns. Additionally, the sigfnificant level of association exists between stock return and log of assets. It might be the case that high correlation between these figures exists due to the expectations of investors, who perceive high levels of assets in the company as a stabilizing factor. As the result, when the company has a huge amount of assets at its disposal, investors aver that even if the company goes bankrupt, there are always physical possessions that could be sold. This fact probably decreases the level of uncertainty in the company and forces the share prices to go up. Moreover, correlational matrix provides information concerning the significant positive relationship between operating profit to sales ratio and log of assets. Assets on the company's disposal might play an important role in both sales and operations: huge amounts of assets allow the company to increase sales and improve operations, thus getting higher operating profits. The operating profit to sales ratio is also positively associated with earnings per share during the five-year period. Such interdependence of these variables is predefined because high earnings per share indicate high net income, which emphasizes efficiency in operations and profitability in sales. One important aspect to notice is that correlational matrix also indicates the negative correlation between debt-to-equity ratio and operating profit to sales ratio, which is especailly strong in years 2013 and 2014 (see Appendices 61,63). The market data for full sample of Finnish and UK companies supports this notion. The growth in debt-to-equity ratio means that the company is financed more from debt rather than form shareholders' equity. In such cases debt should be returned and interest should also be payed back for the time money were borrowed. It means that a fraction of profits earned by company will be spent to cover these expenses. Consequently, the firm might run out of cash. Thus, the company will not be able to invest more resources in facilities to improve

operations and increase sales. The next figure described in correlation table is the log of sales, which is proven to have a positive association with log of assets and earnings per share, while the log of assets is correlated only with earnings per share. Both sales and amount of assets have an impact on the net income of the company, which in turn determines the amount of earnings per share. However, one of the most important things to notice is that in spite of the expectations, the correlational matrix did not capture any positive association between stock return and market return in the case of Finland. This point casts doubts on CAPM model, according to which both of these returns should be interrelated.

When it comes to the the accounting based risk measures in Finland (see Appendices 56, 58, 60,62, 64, 66), the correlational tables indicate that, in contrast to market measures, accounting stock returns are positively related to market level accounting returns. It means that changes in market level accounting returns will have a direct positive impact on the accounting stock returns. Furthermore, there also exists an association of accounting stock return with such variables as log of assets and earnings per share. It is important to mention that operating profit to sales ratio is considered as accounting stock return (ARit-Rft). Therefore, such association can be explained with the idea that from accounting viewpoint the amount of assets that company owns and total earnings (and, consequently, earnings per share) are closely related resulting in more efficient operations and increased sales. The general tendency for accounting risk measures in Finnish market is that the log of sales is positively correlated with log of assets and earnings per share. Due to the interdependence of sales and assets of the firm and the generation of earnings through high sales rates, these variables reflect high degree of association. The correlational tables also indicate the common perception of negative correlation between earnings per share and debt-to-equity ratio, thus, confirming that highly leveraged companies tend to allocate smaller parts of their earnings to shares due to the fact that such firms have lower amounts of earnings after

all the debts and interests payments are payed back. Hence, such firms have lower earnings per share rates.

Considering the case of UK, market information is first presented in the correlational tables (see Appendices 67, 69, 71, 73, 75, 77). The results of degree of association between stock return and market return are ambivalent. The outcomes vary depending on the year that was taken into consideration. In some years the correlation is positive, while in some years the correlation is negative. However, in spite of type of correlation, it is almost impossible to conclude that such association is significant, as only in one out of five examined years correlation was significant enough, in other years the relationship failed to meet the requirements for significance. Therefore, it is possible to conclude that the situation in UK market coincides with the situation on the Finnish market, where no significant relationship was determined between stock returns and market returns. Surprisingly, correlation has also illustrated the existence of negative association between stock returns and log of assets; and stock returns and log of sales. It is a common practice to perceive that increased amounts of sales and assets lead to prosperity, and thus, to higher stock returns. However, in case of UK such point is proven to be wrong. The possible explanation for this phenomenon might be that companies, that have increased sales tend to devote most of their profits towards obtaining new forms of assets, thus spending a huge fraction of their earnings instead of investing in other more important spheres like improving the efficiency of operations. In that case the company might lose its competitive advantage on the market and be outperformed by rivals. As a result, the level of credibility drops and stock returns decrease. One feature that captures attention is ambiguious correlation between stock returns and earnings per share. Throughout the years such association is highly significant, but in years 2010, 2011 and 2014 the relation is positive, while in years 2012 and 2013 the correlation is negative. It might be possible to conclude that from the year 2011 on there have been serious changes in UK market, which

forced the variables to switch the direction of association. This trend has probably lasted for two years, and in 2014 the variables has changed the direction once again and returned back to positive correlation. Unfortunately, it is impossible to determine precisely, what kind of changes in UK market has had such a strong impact. The variable operating profit to sales ratio reflects highly unexpected correlations with variable log of sales This correlation has a negative sign indicating that, in spite of expectations, in most of the UK companies increases in sales would lead to decreases in operating profit to sales ratio. The possible reason is that once the amount of sales is growing, but the profit from operations remains the same, the ratio gets smaller. The variable log of sales in most of the years supports the general idea of interdependence with log of assets, as increased sales tend to lead to an enlarged amount of assets and vice versa. However, in contrast to Finnish market, log of sales in UK illustrates positive correlation with debt-to-equity ratio in years 2012, 2013 and full sample (see Appendices 71, 73, 77). This tendency can be justified by saying that once the company obtains some amount of debt, it can invest the money in the modifications of the production line, which guarantees increased amounts of goods produced, and, consequently, growing sales. It might be the case that the same reason also serves as justification for a positive correlation between earnings per share figure and debt-to-equity variable for year 2014 and full sample of UK companies for a five-years period.

Correlation tables representing association between the variables of accounting based risk measure support the common perception of positive relationship between accounting stock returns and market level accounting returns in the case of UK companies (see Appendices 68, 70, 72, 74, 76, 78). This view avers the idea that since the analyzed companies remain a part of the market, there should exist a certain correlation between these variables. Furthermore, the accounting data concerning the UK firms also supports market data in terms of negative correlation between accounting stock returns and log of sales. Since accounting stock returns represent

operating profit to sales ratio (Rit) minus risk-free rate (Rft), it is probable that once sales increase, the ratio might decrease in value as long as operating profit remains the same or even decreases. When it comes to the log of sales variable, it is significantly correlated with log of assets throughout the five-year period and debt-to-equity ratio in years 2012 and 2013 (see Appendices 72,74). The total sample outcomes also support these correlations. Such association was predictable, as aggrandized amounts of assets and additional money supply through debt might help to increase the volumes of manufacturing, improve promotion campaigns and as a result, lead to greater sales. One more remarkable feature of the UK correlational tables is that in several years there was noticed a negative correlation between log of assets and earnings per share variables. The reason for that might be the situation, when company decides to spend a huge fraction of its profits on the purchase of new assets rather than on the reallocation of the earnings to shares. In that case the amount of assets in the company will increase, while the earnings per share will rapidly fall.

The combined data on Finnish and UK markets provides information on 700 cases, which reflect real situation in both of these countries (see Appendices 79, 81,83, 85, 87, 89). The correlation of market model variables indicates that there exists positive and highly valuable correlation between stock returns and market returns. This fact is truly surprising as in each of the years studied there was no correlation determined between stock returns and market returns either for Finland or for UK. It is possible that larger sample of 700 cases has had an influence on the final relations, as it is noticed that with smaller samples such association did not exist. The negative association was also determined between stock returns and each of the following variables: operating profit to sales ratio, log of sales, log of assets, and earnings per share. Unfortunately, there is no precise explanation existing, which could possibly justify such discrepancies. However, it is possible to notice that stock returns in UK market also had negative association with log of sales and log of assets. Taking into account

that the sample of UK companies was larger than sample of Finnish companies, it is possible that the tendencies of UK market might apply to the total sample, thus forcing the variables to have the same correlation as solely in UK sample. Furthermore, the correlational table has helped to determine the existence of postive correlation between operating profit to sales ratio with log of assets and with earnings per share. The growth of assets and earnings per share in that case would be a cause of the increased amounts of sales, overall productivity and higher profits, leading to greater values of operating profit to sales ratio. The variable log of sales is inevitably connected with the variable log of assets, which is proven through positive association of these variables.

Accounting data on the full sample consisting of Finnish and UK companies also provides several important insights (see Appendices 80, 82, 84, 86, 88, 90). First of all, accounting stock returns are predictably correlated with market level accounting stock returns. This idea is also proven separately in the cases of each country. However, contrary to market data, there is positive association determined between accounting stock returns and each of these variables: log of assets, earnings per share. The discrepancy in the correlation outcomes in that case between market and accounting measures indicates that these models initially capture different information. The log of sales variable is also positively associated with log of assets. Such relationship was also well-founded in market model, which proves its underlying validity.

5.3 Inferential statistics: multi-variate regression

A multiple regression was conducted in order to forecast the value of stock return in the case of market model and accounting stock return in the case of accounting based model. All variables with regard to the risk-free rate are presented in the tables. Hence, the market return (Rmt-Rft), stock return (Rit-Rft), market level accounting return (ARmt-Rft) and accounting stock return (ARit-Rft) are considered. First, market data on Finnish companies

will be analyzed, then accounting data will be further examined. In the case of UK, the same pattern will be used by analyzing first market variables, and after that accounting variables. The multi-variate regression of Finnish market variables can be observed in the form of table (see Table 1). The table represents the regression coeffcients for each variable for the five-year period and for the total sample of all Finnish companies for all five years. The constant term is also included in the table, which can be differently referred to as alpha. Stock returns in the market model is considered to be dependent variable.

As can be seen from the table (see Table 1), the Finnish data for the year 2010 indicates that the stock return is positively affected by such factors as operating profit to sales ratio, log of assets and earnings per share. This means that these variables are interrelated with the stock return variable. Despite the small value, variables log of assets and earnings per share have higher rate of significance, when compared with operating profit to sales ratio. It can be concluded that log of assets and earnings per share play the decisive role when it comes to the determination of the risk premium. Aside from the positive association between variables, there also exist negative relationships. Log of sales and debt-to-equity ratio are negatively associated with stock returns. This means that as long as each of these variables grows, the stock return decreases in value. From the significance level it is clearly seen that the log of sales variable is of a crucial importance for the dependent variable. Log of sales, along with the log of assets and earnings per share are the primary factors that affect stock returns. The multiple regression supports the idea presented in correlational tables concerning the fact that there is no significant influence of market returns on stock returns. Hence, the market beta in that case is not capable of positively reflecting the market movements on the stock returns. It becomes obvious that there exist accounting variables that possess better explanatory power for stock returns rather than market beta.

With regards to the year 2011, the multiple regression table indicates that the strongest and most significant impact on stock returns is rendered by the log of sales, log of assets and earnings per share. The log of sales variable, as in year 2010, has negative association with stock returns. This way high sales will lead to the decreased stock returns. The earnings per share also supports the outcomes of year 2010 in positive association with stock returns. However, the log of assets figure has drastically changed the direction of association compare to year 2010. In the year 2011 the log of assets negatively influences the stock returns. There are also several other noticeable changes in 2011. The debt-to-equity ratio does not significantly influence the stock returns anymore. It is possible that the economic conjuncture has changed in Finland leading to lower importance of the debt-to-equity ratio. What is more, operating profit to sales ratio plays less significant role in the formation of stock returns than it used to play in 2010. The market beta still remains uncapable of predicting stock returns.

When it comes to the year 2012, the multi-variate regression indicates that a lot of changes have occurred in terms of variables affecting stock returns. The only variable that is capable of determining stock returns is earnings per share. There is a positive and highly significant relationship between these variables, which means that for the year 2012 growth in earnings per share leads to growth in stock returns. Such variables as log of sales and log of assets, which used to be highily important in previous years, have lost their significance in 2012.

In year 2013, the multiple regression coefficients are similar to the ones in year 2010. The main variables affecting the stock returns are log of assets and earnings per share, which have positive association with stock returns and log of sales, which has negative influence on stock returns. Operating profit to sales ratio has also regained its influence and remained significant in the year 2013. There is a positive relation between operating profit to sales ratio and dependent variable, which illustrates that enlarged operating profits as a fraction of sales serve as a basis for growth of stock returns in

Finnish companies in 2013. In the meantime, the debt-to-equity variable has a negative association with stock returns, which implies that the bigger the amount of debt, the smaller the dependent variable. The debt-to-equity figure is less cruicial than the log of sales or log of assets, but it is still highly important for the precise estimation of stock returns.

For the year 2014, the multi-variate regression model provides several important insights. First of all, such variables as log of sales, log of assets and earnings per share prove their importance by being significant in the estimation of stock returns. While earnings per share and log of assets remain being positively related to stock returns, the log of sales follows the pattern of being negatively related to the dependent variable. Operating profit to sales ratio also continues being substantial and favorable for stock returns. However, the debt–to-equity ratio has lost its significance in terms of affecting the stock returns, thus, it is not anymore considered as a variable that has influence on dependent variable. In general the effect of debt-to-equity ratio on stock returns is highly inconsistent, as the significance level of the index is a subject to regular changes.

When it comes to the multiple regression of the total sample of Finnish companies, it is possible to trace that such regression table utilizes the most common features that were inherent to the yearly models. Thus, the log of sales, log of assets and earning per share remain the primary variables that affect the formation of stock returns, where the log of assets and earnings per share have a positive influence, while log of sales has a negative influence. The operating profit to sales ratio is also valuable in its positive association with stock returns. The greatest changes in the stock returns will be caused by the movements in the operating profit to sales ratio, as the value of its regression coefficient is the greatest. The debt-to-equity ratio is also robust with its negative relations to the stock returns.

As can be noticed from the multiple regression table (see Table 1), the market returns showed no significant influence on the return of individual stock. Even the larger total sample, which contained around 300 cases, did not provide any data on the association betweeen the variables. In that case it is possible to conclude that the market return has no substantial influence on the formation of stock returns in the case of Finnish market in general and the assumptions of CAPM model are dubious. While the CAPM model was proven to ineffective in the Finnihs settings, such accounting inputs as operating profit to sales ratio, log of sales and earnings per share have illustrated their capabilities of affecting the stock returns.

Table 1: Inferential statistics: multiple regression Finland, market

	2010	2011	2012	2013	2014	Total
Constant	-0,008	-0,008	-0,008	-0,008	-0,008	-0,008
Market Return (Rmt-Rft)	0,015 (0,269)	0,135 (1,142)	-0,092 (-0,763)	0,034 (0,616)	0,028 (0,492)	0,015 (0,268)
Operating Profit to Sales Ratio	0,115* (2,067)	0,207ψ (1,660)	0,033 (0,262)	0,086ψ (1,524)	0,101ψ (1,783)	0,115* (2,066)
Log of Sales	0,000** (-5,662)	0,000** (-3,245)	0,045 (0,363)	0,000** (-5,025)	0,000** (-4,533)	0,000** (-5,662)
Log of Assets	0,000** (7,236)	-0,330** (-2,723)	0,020 (0,158)	0,000** (6,813)	0,000** (5,941)	0,000** (7,237)
Earnings per Share (EPS)	0,000** (3,737)	0,001** (4,899)	0,000** (3,688)	0,000** (3,153)	0,000** (2,936)	0,000** (3,735)
Debt to Equity Ratio (D/E)	-0,084ψ (-1,577)	0,065 (0,530)	0,055 (0,458)	-0,089ψ (-1,649)	-0,068 (-1,209)	-0,084ψ (-1,577)

Dependent variable: Stock premium (Rit-Rft)

**- statistically significant at 0,01 level (2-tailed)
* -statistically significant at 0,05 level (2-tailed)
Ψ - statistically significant at 0,1 level (2-tailed)

The mutli-variate regression table based on the accounting risk measure is presented below (see Table 2). The dependent variable in that case is accounting stock return (ARmt-Rft), which is represented by the operating profit to sales ratio (ARit) minus risk-free rate (Rft). For the year 2010 there exists a strong and significant association between market level accounting stock returns and accounting stock returns. This implies that the market level accounting stock return has a defining power in affecting the accounting stock return. In that case the changes on the market will have a direct and strong impact on the accounting returns. It can be seen that the value of accounting beta coefficient exceeds one. This means that any 1% change in the market level accounting stock return will lead to greater changes in the accounting stock returns. Furthermore, debt-to-equity ratio is also substantial in its degree of positive influence on the accounting stock returns.

When it comes to the year 2011, the multi-variate regression table illustrates a new insight when compared to year 2010. The debt-to-equity figure does not have a significant influence on the accounting stock return. However, the log of assets has obtained a sufficient power to affect the accounting stock returns. The influence is positive, thus, the more assets company owns, the higher should be the accounting stock returns. The market level accounting stock return remained being the most influential variable that has direct effect on the prices of shares. In the case of the market level accounting stock returns the accounting beta is slightly greater than one. In such cases the 1% change in the market level accounting stock returns will lead to greater changes in the accounting stock returns of a company.

In the year 2012 no significant changes occurred when compared with year 2011. The market level accounting stock return still remains the strongest in terms of influence on the dependent variable. However, the beta’s value

became even higher, which means that even greater changes will occur with accounting stock returns with 1% change in market level accounting stock returns. The log of assets also obtains a significant association with accounting stock returns.

For the year 2013, the multi-variate regression table provides information on the changes, which happened in that year. The debt-to-equity ratio gained power and remains significant in its effect on the accounting stock returns. Furthermore, the log of assets variable, which has been strong in the previous years, has lost its predictability power and is not significant in its influence anymore. The market level accounting return is still the strongest in its impact on the accounting stock returns of a company

With regards to the year 2014, the great changes have occurred in the Finnish companies, which lead to the changes in association with the dependent variable. First of all, two new variables entered the stage, such as log of sales and earnings per share. Both variables are highly significant in their influence on the dependent variable, but such influence is negative in nature. This means that as long as log of sales and earnings per share grow, the accounting stock return decreases; and when these predictors reduce, the dependent variable increases in value. But since the regression coeffcients in these cases are smaller than one, then 1% changes will lead to movements smaller than 1% in opposite direction. The log of assets variable is highly valuable and significant for predicting the accounting stock returns. It has a positive association with the dependent variable, which means that changes occur in a similar direction in both of these variables. The debt-to-equity variable is not a significant predictor for the dependent variable and its effect can not be considered in the formation of the accounting stock returns. The variable market level accounting return is still highly significant, but the value of beta has decreased and in 2014 is almost equal to one. This indicates that movements in market level accounting returns and accounting stock returns will almost coinside with each other.

The total sample of Finnish companies considered from the accounting perspective utilizes the most common features that were present in each of the years. The coeffcient values of debt-to-equity ratio and log of assets are highly significant and reflect a positive impact of these predictors on the dependent variable. In the meantime, the log of sales and earnings per share show negative degree of impact on the accounting stock return. The main predictor for the dependent variable is still the market level accounting return, which has lost a bit of value in beta and is a bit smaller than one for the full sample. The value of the accounting beta indicates that 1% change in these returns will lead to smaller changes in the accounting stock returns. Despite the fact that in all of the examined years the value of such beta exceeded one, for the total sample the value of such beta was smaller than one. Such discrepancy might be explained with the effect of the larger sample.

Table 2: Inferential statistics: multiple regression Finland, accounting

	2010	2011	2012	2013	2014	TOTAL
Constant	-0,051	0,007	0,009	-0,020	0,018	0,037
Market level acc. return (ARmt-Rft)	1,392** (6,954)	1,071** (6,699)	1,304** (5,828)	1,235** (6,204)	1,014** (8,321)	0,949** (18,481)
Log of Sales	-0,137 (-1,388)	-0,051 (-0,517)	-0,059 (-0,561)	-0,090 (-0,843)	-0,144** (-10,481)	-0,147** (-23,057)
Log of Assets	0,070 (0,683)	0,161ψ (1,647)	0,166ψ (1,608)	0,142 (1,320)	0,143** (11,251)	0,143** (23,665)
Earnings per Share	-0,101 (-0,885)	-0,115 (-0,896)	-0,179 (-1,289)	-0,046 (-0,386)	-0,111ψ (-1,796)	-0,122* (-2,316)
Debt to Equity Ratio	0,065* (2,556)	0,056 (0,551)	0,093 (0,888)	0,024* (2,493)	0,115 (1,123)	0,009** (3,574)

Dependent variable: Accounting stock return (ARit-Rft)

**- statistically significant at 0,01 level (2-tailed)
* -statistically significant at 0,05 level (2-tailed)
Ψ - statistically significant at 0,1 level (2-tailed)

The multi-variate regression on the UK market is presented below (see Table 3). This table indicates the variables considered from the market viewpoint. The dependent variable in that case is stock return (Rit-Rft). In the year 2010 only three variables play a significant role in the formation of the stock returns. These variables are: log of sales, log of assets and earnings per share. The remarkable feature is that only earnings per share is positively associated with the dependent variable. The log of sales and log of assets variables influence the stock returns negatively. In other words, the higher the log of assets and log of sales values, the smaller the value of the dependent variable and vice versa. The year 2011 is almost similar in its results to the year 2010. The log of sales and log of assets are still negatively associated with stock returns, while the earnings per share have positive influence on the dependent variable.

When it comes to the year 2012, the multiple regression table provides several important insights. Two of the variables, which used to be highly significant in previous years, have lost their predicting power in 2012. The log of sales and log of assets are not substantial anymore for the estimation of stock returns. The only variable that remained significant is the earnings per share. However, in spite of the positive influence in years 2010 and 2011, the variable has changed its direction of association in year 2012. Therefore, the earnings per share has a negative predicting power for the dependent variable in 2012. Thus, the higher the earnings per share, the smaller the stock return. Several changes have also occurred in the year 2013. The earnings per share has lost its significance for the dependent variable. However, the log of assets has regained its effect on the stock returns. The log of assets has negative relations with the dependent variable.

For the year 2014, the multi-variate regression table illustrates the important phenomenon. The market stock return has for the first time gained the significance for predicitng the return of a single stock. Even during the examination of the Finnish market such relationship did not exists. In the UK market this also was not the case until the year 2014. The association between variables is positive, which reflects movements in a similar directions. Furthermore, the debt-to-equity ratio has also obtained a significant power in influence towards the stock returns, and, what is more, such relationship is also positive. This surprisingly means that the higher the debt-to-equity ratio, the higher the stock returns. Such variables as log of sales and log of assets still have negative effect on the dependent variable and move in opposite directions with it.

With respect to the larger sample consisting of all the UK based companies for a five-year period, the only variable that is significant in predicting the stock returns is the log of assets. This variable has a negative association with the dependent variable, which indicates that when the assets in the company are increasing, the value of stock returns is decreasing. No other type of significant relationships was determined. For the larger sample only the most influential and significant variable was determined as the one having the highest predictability power.

Table 3: Inferential statistics: multiple regression UK, market

	2010	2011	2012	2013	2014	Total
Constant	-0,015	-0,016	-0,016	-0,014	-0,015	-0,015
Market Return (Rmt-Rft)	-0,012 (-0,115)	-0,067 (-0,615)	-0,025 (-0,226)	0,023 (0,711)	0,148ψ (1,534)	0,026 (0,534)
Operating Profit to Sales Ratio	0,017 (0,150)	-0,028 (-0,229)	0,102 (0,880)	-0,001 (-0,538)	0,076 (0,688)	0,038 (0,763)
Log of Sales	0,000** (-2,977)	0,000* (-2,424)	-0,057 (-0,524)	0,000 (0,979)	-0,223* (-2,186)	0,000 (0,005)
Log of Assets	-0,280** (-2,758)	-0,173ψ (-1,604)	-0,121 (-1,109)	-0,001ψ (-1,601)	0,000** (-3,564)	0,000** (-3,727)
Earnings per Share (EPS)	0,00001** (3,692)	0,000009** (2,788)	-0,000007* (-2,400)	0,000 (-1,030)	0,161 (1,341)	0,061 (1,233)
Debt to Equity Ratio (D/E)	0,000 (0,002)	-0,092 (-0,845)	-0,071 (-0,647)	0,000 (0,585)	0,000** (4,325)	0,025 (0,511)

Dependent variable: Stock return (Rit-Rft)

**- statistically significant at 0,01 level (2-tailed)
* -statistically significant at 0,05 level (2-tailed)
ψ - statistically significant at 0,1 level (2-tailed)

The table presented below (see Table 4) reflects the multiple regression of the accounting variables in the UK market. The dependent variable is the accounting stock return (ARit-Rft). For the year 2010, in contrast to Finland, three variables play a significant role in the formation of the accounting stock returns. These variables are: market level accounting return, log of sales and log of assets. The market level accounting return has a positive and highly significant relaitonship with the dependent variable. The beta slightly exceeds the value of one, which indicates that 1% movement in market level accounting returns leads to almost similar and slighly bigger

changes in accounting stock returns. The log of assets also has a positive association with the dependent variable. However, the log of sales is negatively influencing the accounting stock returns. This means that for the UK companies in 2010 growing sales lead to decreased amounts of accounting stock returns.

Almost similar outcomes are presented for the year 2011, where the market level accounting return has defining power on the dependent variable. In that case the value of the accounting beta has increased indicating that even greater changes will occur with the accounting stock returns with 1% change in the market level accounting returns. The log of sales remains having negative relationship with dependent variable, which justifies the opposite direction of changes in values of these variables. The log of assets has positive influence on the accouniting stock returns,as it used to have in year 2010.

The results of the years 2012, 2013 and 2014 almost conside with the outcomes of 2010 and 2011, which indicates the stability of the effects received through the multiple regression. In all of these years the market level accounting returns have positive degree of influence on the dependent variable. In 2012 and 2013 the accounting beta is slighly bigger than one, which means that movements in accounting stock returns will a bit exceed the market level accounting returns. However, in 2014 the value of the accounting beta is less than one, which means that greater changes will occur in market rather than on individual stock. The log of sales variable has negative effect on the dependent variable throughout these years, while the log of assets have a positive influence and the value of its coeffcient remains more or less the same in these three years. When it comes to the results of the total sample of the UK companies examined from the accounting perspective, the tendency remains the same as in all of the previous years. Such stability provides additional support to the idea that the outcomes are trustworthy. The market level accounting returns and the log of assets varibles have positive degree of association with the

dependent variable. The log of sales variable, on the contary, negatively affects the accounting stock returns.

Table 4: Inferential statistics: multiple regression UK, accounting

	2010	2011	2012	2013	2014	Total
Constant	-0,131	-0,232	-0,196	-0,136	-0,109	-0,168
Market level acc. return (ARmt-Rft)	1,021** (19,762)	1,137** (24,827)	1,079** (16,325)	1,093** (18,226)	0,996** (22,837)	1,076** (46,521)
Log of Sales	-0,037** (-5,544)	-0,028** (-3,494)	-0,041** (-5,100)	-0,040** (-6,419)	-0,051** (-8,457)	-0,039** (-12,336)
Log of Assets	0,054** (7,200)	0,057** (6,091)	0,066** (7,234)	0,057** (7,793)	0,064** (9,260)	0,060** (16,551)
Earnings per Share (EPS)	-0,010 (-0,162)	-0,016 (-0,299)	-0,013 (-0,181)	-0,023 (-0,344)	0,009 (0,134)	-0,014 (-0,496)
Debt to Equity Ratio (D/E)	0,016 (0,282)	0,019 (0,417)	0,030 (0,455)	0,018 (0,306)	0,026 (0,463)	0,013 (0,553)

Dependent variable: Accounting stock return (ARit-Rft)

**- statistically significant at 0,01 level (2-tailed)
* -statistically significant at 0,05 level (2-tailed)
Ψ - statistically significant at 0,1 level (2-tailed)

The inferential statistics concerning the multiple regression of the full sample of Finnish and UK companies is presented in the table below (see Table 5). The table deals only with the market model. The dependent variable is stock return (Rit-Rft). The full sample of Finish and UK companies consists of 140 companies and is examined on the yearly basis, and then the total sample of 700 cases is described in the last column.

For the year 2010, several variables show significant relationship with the dependent variable. The debt-to-equity ratio is proven to have substantial

and positive influence on the stock returns. This means that the higher this predictor, the greater the value of the dependent variable. Furthermore, such variables as log of sales, log of assets and earnings per share have negative impact on the formation of the stock returns. The decline in the values of these predictors would force the value of the dependent variable to rise. The table has also illustrated an unexpectedly significant effect of market returns on stock returns. It was noticed that neither for Finnish market nor for UK market (except for the year 2014), there was determined no substantial relationship between such variables. However, the possible explanation for such phenomenon is the change in the sample size, which can play one of the most important roles in the existence of such association. Therefore, the market return has a positive impact on the stock return. For the full sample the assumptions of CAPM are valid, which is illustrated by the value of the market beta. However, it can be noticed that other variables are also necessary for the calculation of the stock returns. Therefore, the inclusion of such inputs in the model implies that the conclusions by Basu (1977, 680) and Banz (1981, 17) concerning the necessity to consider accounting factors is vindicated.

Considering the year 2011, it is important to notice several differences from the year 2010. The operating profit to sales ratio has obtained a significant amount of predicting power and has a positive relationship with the stock returns. The debt-to-equity ratio, on the contrary, has lost its effect on the dependent variable and cannot be anymore considered as a significant predictor. The common features that year 2011 shares with 2010 is that log of sales, log of assets and earnings per share continue having negative impact on the stock returns. Hence, the positive changes in these predictors lead to opposite changes in the value of the dependent variable. The market return also obtains a significant predicting power with respect to the stock returns. In the year 2012 the amount of variables that are capable of having a significant impact on the dependent variable has decreased. The earnings per share is one of the two variables that remained substantial; the

relationship continued being negative. The market return is the second predictor that has kept its strong positions and positive effect on the stock returns.

With respect to the year 2013, the operating profit to sales ratio has become significant again. However, such significance is of a new nature: the predictor has negative influence on the dependent variable. In other words, the decrease in operating profit to sales ratio would lead to the growth in the value of stock returns. The earnings per share variable continued having negative effect on the dependent variable; and the market returns remained positively associated with the stock returns.

The year 2014 had remarkably different results from any year that was examined before. In this respect the outcomes of the overall sample to all Finnish and UK companies for the five-year period are almost similar. The results of both 2014 and the total sample illustrate that there exists a negative influence of log of sales, log of assets and earnings per share on the dependent variable. These influences are highly significant. The positive relationship is determined with the variable debt-to-equity ratio. The total sample also has operating profit to sales ratio as a significant predictor of the stock returns due to its positive association with the dependent variable. In both 2014 and the total sample the market return is substantially and positively related to the stock returns. It can be noticed that throughout the five-year period of a large sample of Finnish and UK companies the market return remains strong in its predicting power. Therefore, for the larger sample the market beta has illustrated its predicting power. However, the inclusion of accounting variables is still justified, as the market beta solely is not sufficient for the precise estimations.

Table 5: Inferential statistics: multiple regression full sample, market

	2010	2011	2012	2013	2014	Total
Constant	-0,006	-0,013	-0,010	-0,009	-0,006	-0,008
Market Return (Rmt-Rft)	0,162** (4,822)	0,050** (2,844)	0,161** (5,567)	0,221** (6,380)	0,138** (4,633)	0,108** (9,093)
Operating Profit to Sales Ratio	0,088 (1,141)	0,141* (1,738)	0,150 (0,211)	-0,117ψ (-1,661)	-0,034 (-0,448)	0,003* (2,264)
Log of Sales	0,000* (-2,093)	-0,152* (-1,989)	-0,078 (-1,113)	-0,073 (-1,023)	-0,001** (-3,208)	-0,157** (-4,719)
Log of Assets	-0,124ψ (-1,642)	-0,142ψ (-1,854)	-0,095 (-1,365)	-0,099 (-1,397)	-0,213** (-3,109)	0,000** (-4,556)
Earnings per Share (EPS)	-0,0006** (-5,134)	-0,0004** (-5,198)	-0,0005** (-7,249)	-0,0005** (-6,030)	-0,0004* (-5,276)	-0,0005* (-12,524)
Debt to Equity Ratio (D/E)	0,122ψ (1,615)	0,014 (0,185)	-0,045 (-0,643)	-0,016 (-0,225)	0,001** (3,553)	0,000** (2,460)

Dependent variable: Stock return (Rit-Rft)

**- statistically significant at 0,01 level (2-tailed)
* -statistically significant at 0,05 level (2-tailed)
ψ - statistically significant at 0,1 level (2-tailed)

When it comes to the accounting based risk measure, the accounting variables that might possibly have an effect on the dependent variable are described in the table below (see Table 6). The dependent variable in that case is the accounting stock return (ARit-Rft), which is presented by the operating profit to sales ratio (ARit) minus risk-free rate (Rft). First, the total sample of Finnish and UK companies is analyzed through the five-year period, and then these cases are combined and form 700 cases, which are presented in the last column.

Having a closer look on the years 2010, 2011 and 2012, it is possible to trace certain similarities in the degree of influence of predictors on the dependent variable. The negative effect of the log of sales and earnings per share on the accounting stock returns can be easily observed. The log of assets has a positive influence on the dependent variable, but since its regression coefficient is smaller than one, then 1% change in assets of the firms will lead to smaller changes in the accounting stock returns. The market level accounting returns also has significant and positive association with the dependent variable; and its influence is quite strong throughout the all five-year period. The accounting beta is almost equal to one in every year indicating almost equal co-movements in the values of these variables.

For the year 2013, the general tendency remains the same with only few exceptions. The earnings per share variable has lost its predictability power and influence on the formation of accounting stock returns. Instead of earnings per share, the debt to equity ratio has gained sufficient power to have an impact on the dependent variable. The relationship can be described as positive. Thus, growth in debt leads to the growth in accounting stock returns. However, for the year 2014, the debt-to-equity ratio has again lost its significance, but the earnings per share have restored their negative influence on the dependent variable.

With regards to the total sample of all Finnish based and UK based companies for the five-year period, all examined accounting variables were proven to have a significant impact on the accounting stock returns. The market level accounting returns and log of assets traditionally have positive enforcement on the dependent variable, while log of sales and earnings per share negatively suppress the accounting stock returns. Due to the fact that the full sample was taken into consideration, the variable debt-to-equity has also showed its impact. In spite of being significant only in year 2014, for the 700 cases the variable has illustrated its positive importance.

Table 6: Inferential statistics: multiple regression full sample, accounting

	2010	2011	2012	2013	2014	Total
Constant	-0,018	-0,053	-0,020	-0,008	-0,025	-0,023ᵠ
Market level acc. Return (ARmt-Rft)	0,941** (13,883)	1,026** (19,879)	0,937** (13,576)	0,997** (11,980)	0,957** (16,847)	0,981** (31,768)
Log of Sales	-0,095** (-9,650)	-0,070** (-7,965)	-0,088** (-9,311)	-0,105ᵠ (-1,802)	-0,093** (-11,606)	-0,083** (-20,973)
Log of Assets	0,098** (9,881)	0,077** (8,699)	0,092** (9,891)	0,107ᵠ (1,794)	0,097** (12,459)	0,087** (22,159)
Earnings per Share (EPS)	-0,105ᵠ (-1,603)	-0,099ᵠ (-1,795)	-0,142* (-2,012)	-0,051 (-0,764)	-0,121ᵠ (-1,791)	0,000* (-2,045)
Debt to Equity Ratio (D/E)	0,063 (1,034)	0,033 (0,661)	0,044 (0,696)	0,008* (2,103)	0,027 (0,456)	0,003** (2,543)

Dependent variable: Accounting stock return (ARit-Rft)

**- statistically significant at 0,01 level (2-tailed)
* -statistically significant at 0,05 level (2-tailed)
ᵠ - statistically significant at 0,1 level (2-tailed)

The presented tables provide sufficient amount of information to determine whether the formulated hypotheses should be accepted or refuted. The first hypothesis claimed that the market beta is capable of positively reflecting the effects of the market retruns on the firm-level stock returns on the full sample of Finnish and UK based companies. In order to figure out whether such perception is valid, closer attention should be payed on the Table 5. The regresison coefficients in this table indicate considerable degree of influence of market returns on the stock returns. Such association remains justified throughout the five-year period of analysis, which considers 140 companies, and for the total sample of all the cases combined with the total amount of 700 cases. It might be concluded that the first hypothesis is proven to be sound. However, when it comes to the two sub-hypotheses, which define the level of importance of market beta for Finnish and UK markets separately, there exist certain inconsistentices, which impede the validation of these sub-hypotheses. Referring to the tables 1 and 3, and

paying more detailed attention on the market beta of these tables, it is clearly visible that these coefficients are not substantial. This indicates that the market returns of Finland and UK considered separately have no influence on the formation of the stock returns. In other words, the companies remain detached from the market and predicting the stock returns from the market returns will yield erroneous results. The CAPM model can not be recongnized as efficacious approach for the estimation of the cost of equity in the cases of Finnish and UK markets. Therefore, both of the sub-hypotheses should be refuted, as the evidence from the market data does not support their claims. The tendency in the accuracy of the CAPM demonstrates that the model does not generate proper outcomes with the small sample, however, once the larger sample is considered, the model is capable of producing the rigorous results.

The second hypothesis averred that there exists a positive relationship between accounting beta and accounting stock returns on the full sample of Finnish and UK companies. The table 6 illustrates the regression coefficients for the accounting based risk measures. The observed data indicates that for the large sample the market level accounting returns have a decisive degree of influence on the accounting stock returns. This fact denotes that the movements in market level accounting returns will cause the changes in the accounting stock returns. Thereby, the second hypothesis is validated and proven to be legitimate. Furthermore, the sub-hypotheses in this section refer to the relationships between accounting beta and accounting stock returns on the cases of Finnish and UK markets. As can be observed from the second and fourth tables (see Table 2, Table 4) the accounting betas are highly significant and indicate strong and positive degree of influence of the market level accounting returns on the accounting stock returns. Therefore, both of the sub-hypotheses can be validated. The presented tables for the accounting based risk measure reveal that regardless of the country, sample size or year, accounting beta has positive relationship with accounting stock returns.

In order to substantiate the third hypothesis, which asserted that market beta and accounting beta are positively associated on the full sample of Finnish based and UK based companies, further analysis should be conducted. To determine the degree of correlation between the betas, the new table is created (see Table 7), which contains information on the market and accounting betas that were presented in the previous tables. The market and accounting betas are dividided into several groups depending on the country and years for the ease of the visual perception. First, Finnish betas are listed, then UK coefficents, and the betas for the full sample are specified at the bottom of the table.

Table 7: Market and Accounting regression coefficients (betas)

Market Beta	Years		Accounting beta	Years	
Finland	2010	0,015	Finland	2010	1,392
	2011	0,135		2011	1,071
	2012	-0,092		2012	1,304
	2013	0,034		2013	1,235
	2014	0,028		2014	1,014
	All Years	0,015		All Years	0,949
UK	2010	-0,012	UK	2010	1,021
	2011	-0,067		2011	1,137
	2012	-0,025		2012	1,079
	2013	0,023		2013	1,093
	2014	0,148		2014	0,996
	All Years	0,026		All Years	1,076
Full Sample	2010	0,162	Full Sample	2010	0,941
	2011	0,050		2011	1,026
	2012	0,161		2012	0,937
	2013	0,221		2013	0,997
	2014	0,138		2014	0,957
	All Years	0,108		All Years	0,981

To determine the degree of association between these two betas, the correlation should be performed with the help of the statistical program SPSS software. First only the full sample of Finnish and UK based companies is considered in order to validate or refute third hypothesis. The

results of the correlation between market and accounting betas for the full sample are presented in the Table 8.

Table 8: Correlation coefficient: market and accounting betas, full sample

	Market Beta	Accounting beta
Market Beta	1	-,451**
Accounting beta	-,451**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

The correlation coefficient between market beta and accounting beta for the full sample of Finnish and UK companies has a negative sign. The coefficient is highly significant, which proves its correctness. The negative correlation between the betas shows that they are not positively associated, thus, the results predicted by the market based risk measure do not generally coincide with the outcomes of the accounting based risk measure for the large sample. Thus, accounting based risk measures are not interchangeable with the market based risk measures for the full sample of UK and Finland markets. The validity of the third hypothesis is not supported by the evidence, thus, it must be refuted.

The correlation coefficient between market and accounting betas on the Finnish market was statistically ascertained using the beta coefficients from the upper part of the Table 7, which refers exclusively to the Finnish betas. The coefficient of the association between market and accounting betas is presented in the Table 9.

Table 9: Correlation coefficient: market and accounting betas, Finland

	Market Beta	Accounting beta
Market Beta	1	-,420
Accounting beta	-,420	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ᵠ - Correlation is significant at 0,1 level (2-tailed)

As can be seen from the table (see Table 9), the correlation coefficient is not significant, thus the outcomes cannot be precisely established. However, even if we assume that the coefficient is substantial, then the coefficient is negative. According to the sub-hypothesis, there should be a positive correlation between market and accounting betas on the Finnish market. But in the reality such correlation is not observed. Hence, this sub-hypothesis is disproved.

When it comes to the UK market, the necessary data is withdrawn from the Table 7. The UK data is located in the middle of the table (see Table 7) and is named as UK section. The correlation coefficient between market beta and accounting beta on the UK market is presented below (see Table 10).

Table 10: Correlation coefficient: market and accounting betas, UK

	Market Beta	Accounting beta
Market Beta	1	-,682ᵠ
Accounting beta	-,682ᵠ	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ᵠ - Correlation is significant at 0,1 level (2-tailed)

The correlation coefficient between betas is significant in the case of UK, however, the direction of association is still negative. Therefore, the sub-hypothesis that averred the existence of positive correlation between market and accounting betas in the UK market should be refuted, as the outcomes of the conducted correlation convey information on the absence of such positive association.

The common tendency is the negative correlation between market and accounting betas, which was proven on the total sample, Finnish and UK markets. Accounting based and market based risk measures do not complement each other, but rather present vastly dissimilar findings. Thus, the third hypothesis, as well as its sub-hypotheses should be rejected.

To generalize, the results of this thesis demonstrate that the application of the Capital Asset Pricing Model as the main market based risk measure is highly precarious. The findings of this study indicate that the capabilities of CAPM can vary greatly depending on the sample size and the length of the analyzed period. Hence, the predicting power of the market beta rapidly increases once the sample grows. Thereby, the potential investor can not completely rely on CAPM for the estimation of the cost of equity, as the sample size might be too limited. What is more, the usage of the accounting based risk measures has proven its validity on both full sample and country samples. The association with accounting stock returns was significant, which proved the high degree of influence of market level accounting returns on the accounting stock returns. It might be concluded that accounting based risk measure might be used as possible substitute for the CAPM, as its results are proven to be more cogent and reliable. Moreover, predictably no correlation was figured out between market and accounting betas. Therefore, these risk measures yield different results that are not positively associated with each other.

6. Discussion

The discussion chapter is aimed at broadening the understanding of the outcomes of this study by explaining the findings in terms of the research questions and formulated research hypotheses. Also, one of the primary goals of this chapter is to evaluate the importance of the research and to compare the results with similar studies in this field. The significance and practical implementation of the findings are also discussed in this section.

The general structure of the chapter includes the summary of the main findings, and their association with the research questions and aims of the study. Then, the areas of possible application and the significance for the stakeholders will be discussed. The findings of this thesis are further assessed in relation to the existing studies with the goal to determine the new insights that were discovered in this research. The limitations of the current study as well as the recommendations for further research are presented.

6.1 Summary of key findings

The main objective of this research was to ascertain whether market beta is capable of successfully predicting the stock returns, whether accounting based risk measures are sound in their estimation of the future accounting stock returns and whether market beta and accounting beta are positively associated and could potentially be used as substitutes to each other.

The correlation and regression analyses of the secondary data obtained from databases and financial statements of the firms in Finland and UK has indicated several important points. First of all, it was figured out that the Capital Asset Pricing Model (CAPM) provides investors with varied findings, which depend to a large extent on the sample size of the analyzed dataset. The research has illustrated that for smaller country-level sample sizes the market beta was not capable of successfully predicting stock returns. However, once the sample has increased to 700 cases for the total of

Finnish and UK companies combined, the market beta has proven its efficiency in determining the stock returns. The results for the market based model should be considered with a great care, as the findings might be a subject to changes depending on the sample size. The first research question was asking whether market beta is capable of successfully reflecting the impact of market return movements on a company's stock returns. Therefore, there will be two answers for this question. First answer states that market beta is capable of such reflections for the large sample. However, for the smaller samples the answer on the formulated question is negative. For the smaller sample sizes the researchers and investors are recommended to abstain from using the Capital Asset Pricing Model (CAPM) in order to avoid fallacies. Additionally, it was found out that market beta should be accompanied with company-related accounting variables, which would ensure more accurate estimation of stock returns.

What is more, the findings of this thesis provide the answer to the second research question, which was asking the direction of the association between accounting beta and accounting stock returns. According to the outcomes, accounting beta has illustrated a notable predictability power. The degree of influence remained the same in samples with various sizes. Hence, the accounting beta has had a decisive role in predicting the accounting stock returns for the companies located in Finland, UK and for the full sample. Therefore, the answer to the research question is that accounting beta is positively associated with the accounting stock returns.

With respect to the last research question, which was aimed at determining the relationship between market and accounting betas, the research results support the idea that the betas are negatively associated with each other. Consequently, it was proven that market and accounting betas provide the researchers and investors with different and even contrary outcomes. Even for the full sample, where both market and accounting betas were valid and significant, the correlation coefficient between betas was negative. The possible explanation for this phenomenon is that market and accounting

betas probably capture different effects. Market beta is calculated on the basis of market information, which largely depends on the expectations of investors and can be speculated. The accounting beta, on the contrary, is free from investors' manipulations, but can be exploited in the companies' interests. Furthermore, market beta is perceived as forward looking, because it is based on future predictions, while accounting beta is backward looking, because it is calculated with the data from the performance of the firm in the past (Kim 2004, 5).

6.2 Practical implications

Risk is inherently related to every investment. For the investment appraisal purposes, the estimation of cost of equity is of a primary importance for every investor. The techniques for the calculation of expected returns can vary greatly; however, the investors should utilize the most precise and most accurate ones.

From the perspective of the practical application of the research results, this study is highly valuable for the investors, who are looking for more sophisticated risk measures and consider implementing the accounting based risk measures. Supporting the majority of studies, which refute the validity of CAPM model for every sample, this thesis also casts doubts on the reasonableness of the ubiquitous implementation of this model. The researchers and investors should be aware of the potential fallacies in the findings generated by the Capital Asset Pricing Model, which could be caused by the inadequate sample size or erroneous choice of the market index. However, as long as investors consider large enough samples, all the problems are eliminated and CAPM might be used without the anxiety concerning the validity of results.

Furthermore, those investors, who plan to implement accounting based risk measures as a part of their procedure of estimating the cost of equity, receive additional evidence that supports their intentions. This research might also motivate investors, who were previously unfamiliar with such

approach, to use accounting measures as a part of their appraisal techniques.

Perceptions that accounting beta and market beta provide similar outcomes were getting more and more popular in the recent years. However, this study has illustrated that market and accounting betas mostly contradict each other, rather than coincide. That is why investors should acknowledge that different methods of estimation of cost of equity might yield different results. Therefore, the replacement of one technique with another is not possible. According to the findings of this thesis, the usage of accounting based risk measures is preferred over the usage of market based risk measures, as it remains significant regardless of the sample size. However, investors should also realize that the calculation of accounting beta is far more time consuming then the calculation of market beta, as the market level accounting proxy should be created manually. Consequently, the ubiquitous utilization of accounting based risk measures is hampered. Thus, the investors should familiarize themselves with potential drawbacks of each method before implementing it.

6.3 Assessment of the results in relation to existing research

A wide variety of studies were conducted in the field of estimation of the cost of equity. This thesis contributes to a further and more sophisticated development of the risk measures by providing the results, which are proven to be valid in the settings of the UK and Finnish markets. First of all, the findings on the significance of the market beta will be analyzed in relation to the previous studies. Then, the role of the accounting beta and its direction of association with accounting stock returns will be considered. After all, the results on the correlation between market and accounting betas will be compared with the outcomes of other researches.

When it comes to the market beta, the results of the previous studies are highly contradicting depending on the country, type of analysis, sample size,

additional inputs and so on. The outcomes of the researches by the Clare, Priestly and Thomas (1998, 1225) and by Berglund and Knif (1999, 38-39), which were conducted on the cases of UK and Finnish markets respectively, do not support the findings of this thesis concerning the invalidity of CAPM on the country-level sample. From the results of this thesis it can be concluded that market beta is not capable of precisely predicting stock returns for both Finnish and UK companies. This fact contradicts the findings of the above mentioned studies, where market beta was positively correlated with stock returns. However, the study performed by Ralf Östermark (1991, 223) also examined the degree of association between market betas and stock returns on the cases of Finland and Sweden. The researcher has figured out that the market beta is uncapable of successfully predicting stock returns. This research supports the idea presented in this thesis that CAPM is invalid for the country-level samples of Finnish companies. The same tendency applies to the studies of UK market. Andrew Chan and Alice Chui (1996, 1449-1450) conducted a study of the market beta among the UK companies. It was ascertianed that stock returns are not positively related to the market beta. Therefore, this study also conforms with the findings presented in this thesis.

The outcomes of this research also indicate that market beta is positively and significantly correlated with the stock returns for the full sample of all considered cases. In this respect the findings correspond to the study by Elsas, El-Shaer and Theissen (2003, 16-17) of the German stock exchange. Despite the limited number of companies, the researchers analyzed the period of more than 30 years (from 1960 to 1995). Due to the long period of analysis, the full sample consists of all the examined companies' data taken for each year. Thus, the full sample was large enough to make valuable conclusions. Consequently, the market beta for full sample was proven to be highly significant. One of the most remarkable aspects of the current study is that as well as the reserches by Basu (1977, 680), and Lakonishok, Shleifer and Vishny (1994, 1574-1577), the findings of this thesis have

proven that market beta is not the only factor that affects stock returns. It is figured out that there exist some firm-related features that have a direct impact on the stock returns. These additional inputs in the case of Finnish and UK companies are log of sales, log of assets and earnings per share variables. In other words, current research supports previous studies in the idea that besides market beta, there should also be other company-related characteristics in order to obtain precise estimation of future stock returns.

With respect to the accounting beta and accounting variables, the findings of this study support and coincide with the outcomes of a wide variety of previous researches concerning the significance of the accounting beta. The researchers implement various types of accounting variables to figure out their degree of influence. However, regardless of the type of the chosen accounting variable, the general tendency is that in most of the cases the influence is positive and significant. For example, the study conducted by Barbee, Mukherji and Raines (1996, 59) has illustrated that sales-to-price ratio possesses a significant explantory power. The study on the Tehran stock exchnage by Rahmani, Sheri and Tajvidi (2006, 14) indicated the positive and significant influence of earnings-to-price and size. Talking about the accounting betas in general, it is important to recall that the findinings of this study revealed the substantial and positive explanatory capacity of the accounting beta. These outcomes are similar to the ones presented by Cohen and colleagues (2009, 2739). This research has also figured out that accounting beta is capable of successfully predicting the accounting stock returns. Furthermore, smaller errors were determined when compared with market beta. What is more, the results of this thesis also match with the findings of the study by Nekrasov and Shroff (2009, 1983) in terms of acknowledging the efficacy of the accounting beta.

The degree of association between market and accounting betas is greatly examined by the scholars with the purpose of finding the potential substitute for market beta. According to the findings of this thesis, there is no observable correlation between market and accounting betas. This notion is

supported in the studies by Changwan Kim (2004, 13), who examined the cases of highly indebted companies and figured out that there is no co-movement of the betas. The data on the New Zealand companies presented in the work of Goh and Emanuel (1981, 13) shows support towards the idea that market and accounting betas are weakly correlated. In that case such a weak correlation can not be considered as a cogent association, thus, the market and accounting betas are not interchangeable. However, the findings of this research are in contrast to the study by Beaver, Kettler and Scholes (1970, 679), who have determined significant association between the betas.

6.4 Limitations and Recommendations

With regards to the limitations of the current study, several aspects might possibly have an impact on the interpretation of the research outcomes. First of all, accounting based risk measure requires having data concerning accounting returns on the market level. However, such information does not exist. To address this issue, market proxy was created in an effort to figure out the accounting returns for the market as a whole. Due to the creation of the proxy on the basis of the sample companies, it does not include all firms available in the market. Therefore, it might cause not completely accurate data on the accounting returns for the market level. Furthermore, the linear regression was implemented in this research as the main analysis method. While this method remains trustworthy in the statistical settings, in reality it might be the case that dependent and independent variables have non-linear relationship. Consequently, this limitation opens up new perspectives for further researches in this field. The problem of autocorrelation is the next limitation that is derived from the statistical approach used for this study. Taking into account the fact that the panel data was collected for Finnish and UK companies, it is possible that variables might be linearly associated with themselves at two periods of time. The existence of autocorrelation might impede the validation of the outcomes, as it makes the results less trustworthy.

The limitations of this research provide a wide variety of opportunities for further studies in this area. For example, to capture the non-linear effects between dependent and independent variables, the same phenomenon could be examined with a more precise attention to a non-linear technique. Besides that, enlarging the market proxy by including all companies in the market, rather than assessing only sample companies, might make the market proxy more representative, thus leading to more accurate results. Moreover, examination of more firm specific variables would only benefit this study. This thesis has analyzed only few of the variables. Therefore, adding at least three firm related variables would enhance this work with a more detailed and profound data.

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Appendices

Appendix 1. Descriptive Statistics Finland 2010

Year	2010					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	60	0,0517	-0,0252	0,0266	0,0014	0,0110
Rit	60	0,0119	-0,0020	0,0099	0,0011	0,0017
EPS	60	5,9900	-1,7600	4,2300	0,6427	0,9539
Panel B: Accounting Variables						
Average Annual Operating Profit	60	2153,0000	-83,0000	2070,0000	153,2492	364,5716
Total Sales	60	42439,0600	6,9400	42446,0000	2154,5825	5749,6727
Net Profit	60	1478,0000	-124,0000	1354,0000	116,4730	272,1010
Assets	60	39115,7500	7,2500	39123,0000	2415,3833	5946,3054
Equity	60	16228,3100	2,6900	16231,0000	1007,3492	2487,9754
Total Liabilities	60	22887,4400	4,5600	22892,0000	1408,0498	3476,6528
Debt	60	7382,0000	0,0000	7382,0000	609,3855	1324,1587
Average Market Level Accounting Performance	60	0,4860	-0,2510	0,2350	0,0660	0,0882
Operating Profit to Sales Ratio	60	1,0980	-0,1670	0,9310	0,0833	0,1656

Appendix 2. Descriptive Statistics Finland 2011

Year	2011					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	60	0,1100	-0,0462	0,0638	0,0013	0,0231
Rit	60	0,0058	-0,0036	0,0021	-0,0010	0,0011
EPS	60	7,1200	-4,6000	2,5200	0,4947	1,0459
Panel B: Accounting Variables						
Average Annual Operating Profit	60	3475,0000	-1073,00	2402,00	107,3522	371,9414
Total Sales	60	38651,4600	7,5400	38659,00	2280,3113	5468,5387
Net Profit	60	3350,0000	-1488,00	1862,00	66,0890	334,6433
Assets	60	36197,2400	7,7600	36205,00	2522,3198	5775,7808
Equity	60	13914,6900	1,3100	13916,00	1013,4260	2361,3796
Total Liabilities	60	22284,2100	4,7900	22289,00	1508,8945	3439,9614
Debt	60	7770,0000	0,0000	7770,00	663,6312	1395,0164
Average Market Level Accounting Performance	60	0,5130	-0,2520	0,2610	0,0664	0,0831
Operating Profit to Sales Ratio	60	1,0260	-0,1820	0,8440	0,0774	0,1350

Appendix 3. Descriptive statistics Finland 2012

Year	2012					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	60	0,0533	-0,0201	0,0332	0,0011	0,0104
Rit	60	0,0049	-0,0024	0,0025	0,0001	0,0010
EPS	60	5,2100	-2,3900	2,8200	0,5228	0,9628
Panel B: Accounting Variables						
Average Annual Operating Profit	60	4164,00	-2303,00	1861,00	51,3142	459,7785
Total Sales	60	30166,68	9,32	30176,00	2257,1350	4710,3458
Net Profit	60	5292,00	-3789,00	1503,00	-7,9360	574,2435
Assets	60	29942,15	6,85	29949,00	2505,0022	5280,2147
Equity	60	10824,00	-3,00	10821,00	960,0572	1980,1435
Total Liabilities	60	20498,14	3,86	20502,00	1544,9440	3356,8891
Debt	60	8776,66	0,34	8777,00	693,6778	1490,1433
Average Market Level Accounting Performance	60	0,4120	-0,1810	0,2310	0,0482	0,0683
Operating Profit to Sales Ratio	60	0,9590	-0,1640	0,7950	0,0689	0,1464

Appendix 4. Descriptive Statistics Finland 2013

Year	2013					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	60	0,0461	-0,0245	0,0216	0,0011	0,0085
Rit	60	0,0074	-0,0023	0,0050	0,0005	0,0012
EPS	60	7,9100	-5,0600	2,8500	0,4198	1,0900
Panel B: Accounting Variables						
Average Annual Operating Profit	60	2222,00	-510,00	1712,00	115,3162	296,6524
Total Sales	60	17453,31	8,69	17462,00	1867,1637	3192,3043
Net Profit	60	2282,00	-1003,00	1279,00	49,2482	274,8470
Assets	60	25182,84	8,16	25191,00	2354,1830	4880,2842
Equity	60	10661,31	0,69	10662,00	885,0702	1852,4223
Total Liabilities	60	18525,71	5,29	18531,00	1469,1340	3151,7490
Debt	60	9098,00	0,00	9098,00	716,9310	1589,2971
Average Market Level Accounting Performance	60	0,6210	-0,3680	0,2530	0,0545	0,0875
Operating Profit to Sales Ratio	60	0,8670	-0,1590	0,7080	0,0688	0,1292

Appendix 5. Descriptive statistics Finland 2014

Year	2014					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	60	0,0642	-0,0310	0,0332	0,0009	0,0126
Rit	60	0,0064	-0,0032	0,0031	-0,0001	0,0013
EPS	60	10,8300	-1,3900	9,4400	0,5885	1,4540
Panel B: Accounting Variables						
Average Annual Operating Profit	60	3671,00	-243,00	3428,00	140,5883	469,4145
Total Sales	60	15001,46	9,54	15011,00	1770,1283	2981,0265
Net Profit	60	3915,00	-439,00	3476,00	169,4302	615,5495
Assets	60	21366,47	8,53	21375,00	2176,2227	4267,2069
Equity	60	10933,57	1,43	10935,00	938,8513	1999,9437
Total Liabilities	60	12388,67	5,33	12394,00	1237,5068	2315,2929
Debt	60	6984,00	0,00	6984,00	545,2600	1100,2597
Average Market Level Accounting Performance	60	0,3660	-0,0530	0,3130	0,0681	0,0698
Operating Profit to Sales Ratio	60	0,7670	-0,0450	0,7220	0,0844	0,1454

Appendix 6. Descriptive statistics Finland all years

Year	TOTAL					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	300	0,1100	-0,0462	0,0638	0,0011	0,0140
Rit	300	0,0135	-0,0036	0,0099	0,0001	0,0015
EPS	300	14,5000	-5,0600	9,4400	0,5337	1,1117
Panel B: Accounting Variables						
Average Annual Operating Profit	300	5731,00	-2303,00	3428,00	113,5640	396,6516
Total Sales	300	42439,06	6,94	42446,00	2065,8642	4539,8698
Net Profit	300	7265,00	-3789,00	3476,00	78,6609	441,7001
Assets	300	39116,15	6,85	39123,00	2394,6222	5231,6171
Equity	300	16234,00	-3,00	16231,00	960,9508	2136,3643
Total Liabilities	300	22888,14	3,86	22892,00	1433,7058	3158,0540
Debt	300	9098,00	0,00	9098,00	645,7771	1381,7681
Average Market Level Accounting Performance	300	0,6810	-0,3680	0,3130	0,0606	0,0797
Operating Profit to Sales Ratio	300	1,1130	-0,1820	0,9310	0,0766	0,1440

Appendix 7. Descriptive statistics UK 2010

Year	2010					
	N	Range	Minimum	Maximum	Mean	Standard Deviation
Panel A: Market Variables						
Rmt	80	0,0436	-0,0188	0,0247	0,0016	0,0077
Rit	80	0,0060	-0,0012	0,0048	0,0014	0,0012
EPS	80	148,6000	-21,4000	127,2000	32,6509	32,9369
Panel B: Accounting Variables						
Average Annual Operating Profit	80	423,10	-54,60	368,50	92,7387	89,8200
Total Sales	80	8847,20	42,90	8890,10	1349,0420	1580,6110
Net Profit	80	306,70	-76,80	229,90	58,3989	62,7176
Assets	80	6797,61	102,99	6900,60	1170,8276	1217,5905
Equity	80	2951,50	-84,90	2866,60	450,6418	490,5831
Total Liabilities	80	5130,60	27,30	5157,90	720,1927	865,2113
Debt	80	2621,30	0,00	2621,30	239,0366	404,0418
Average Market Level Accounting Performance	80	0,4492	-0,0948	0,3544	0,1208	0,0878
Operating Profit to Sales Ratio	80	0,7053	-0,3100	0,3953	0,1025	0,0979

Appendix 8. Descriptive statistics UK 2011

Year	2011					
	N	Range	Minimum	Maximum	Mean	Standard Deviation
Panel A: Market Variables						
Rmt	80	0,0703	-0,0368	0,0335	-0,0002	0,0149
Rit	80	0,0074	-0,0053	0,0021	-0,0001	0,0014
EPS	80	226,80	-60,70	166,10	38,2601	42,8197
Panel B: Accounting Variables						
Average Annual Operating Profit	80	828,30	-419,70	408,60	94,5247	116,6435
Total Sales	80	9775,90	33,00	9808,90	1461,0551	1655,4281
Net Profit	80	982,60	-518,00	464,60	62,9043	118,5781
Assets	80	6570,65	119,15	6689,80	1244,2944	1209,9751
Equity	80	2724,90	16,30	2741,20	487,6433	479,3705
Total Liabilities	80	5480,80	25,80	5506,60	755,7781	884,9553
Debt	80	2400,40	0,00	2400,40	255,6955	404,8096
Average Market Level Accounting Performance	80	0,9522	-0,5289	0,4233	0,1214	0,1203
Operating Profit to Sales Ratio	80	1,0420	-0,6073	0,4347	0,0961	0,1396

Appendix 9. Descriptive statistics UK 2012

Year	2012					
	N	Range	Minimum	Maximum	Mean	Standard Deviation
Panel A: Market Variables						
Rmt	80	0,0390	-0,0162	0,0228	0,0007	0,0064
Rit	80	0,0073	-0,0011	0,0062	0,0014	0,0011
EPS	80	215,80	-67,20	148,60	41,0145	40,5386
Panel B: Accounting Variables						
Average Annual Operating Profit	80	788,40	-319,30	469,10	106,9113	108,3351
Total Sales	80	9460,70	30,50	9491,20	1513,2364	1657,5841
Net Profit	80	905,80	-590,10	315,70	70,4746	103,0755
Assets	80	5773,60	133,20	5906,80	1303,3609	1236,5260
Equity	80	2588,30	37,10	2625,40	521,2760	497,4445
Total Liabilities	80	5427,80	21,10	5448,90	787,6066	917,6574
Debt	80	2448,20	0,00	2448,20	266,8711	417,0809
Average Market Level Accounting Performance	80	0,4326	-0,0859	0,3467	0,1322	0,0860
Operating Profit to Sales Ratio	80	0,8080	-0,3803	0,4277	0,1091	0,1027

Appendix 10. Descriptive statistics UK 2013

Year	2013					
	N	Range	Minimum	Maximum	Mean	Standard Deviation
Panel A: Market Variables						
Rmt	80	0,0300	-0,0123	0,0177	0,0007	0,0059
Rit	80	0,0117	-0,0013	0,0103	0,0016	0,0016
EPS	80	185,90	-16,70	169,20	38,2309	38,2136
Panel B: Accounting Variables						
Average Annual Operating Profit	80	496,50	-6,20	490,30	104,9185	86,8572
Total Sales	80	9278,00	36,50	9314,50	1561,0455	1660,6616
Net Profit	80	772,20	-207,60	564,60	74,9266	90,4844
Assets	80	6118,37	166,43	6284,80	1352,8269	1236,4713
Equity	80	2691,60	40,90	2732,50	555,1623	518,2246
Total Liabilities	80	5683,50	53,20	5736,70	797,6725	925,7844
Debt	80	2758,70	0,00	2758,70	269,5779	430,4999
Average Market Level Accounting Performance	80	0,3270	-0,0273	0,2996	0,1213	0,0732
Operating Profit to Sales Ratio	80	0,5935	-0,1699	0,4236	0,1075	0,0914

Appendix 11. Descriptive statistics UK 2014

Year	2014					
	N	Range	Minimum	Maximum	Mean	Standard Deviation
Panel A: Market Variables						
Rmt	80	0,0374	-0,0183	0,0192	0,0003	0,0081
Rit	80	0,0062	-0,0037	0,0025	0,0002	0,0009
EPS	80	501,75	-258,35	243,40	37,8294	53,8200
Panel B: Accounting Variables						
Average Annual Operating Profit	80	1627,30	-1317,30	310,00	84,2594	174,3966
Total Sales	80	8530,00	58,00	8588,00	1636,6915	1654,0219
Net Profit	80	2018,40	-1347,10	671,30	57,4619	181,3537
Assets	80	5812,80	165,20	5978,00	1471,2486	1322,4304
Equity	80	2801,20	-66,20	2735,00	574,7735	532,3198
Total Liabilities	80	5450,30	58,70	5509,00	896,4751	979,4514
Debt	80	1951,70	0,00	1951,70	312,9294	422,2785
Average Market Level Accounting Performance	80	0,6601	-0,3331	0,3270	0,1136	0,0968
Operating Profit to Sales Ratio	80	0,7377	-0,3331	0,4046	0,0990	0,1035

Appendix 12. Descriptive statistics UK all years

Year	TOTAL					
	N	Range	Minimum	Maximum	Mean	Standard Deviation
Panel A: Market Variables						
Rmt	400	0,0703	-0,0368	0,0335	0,0006	0,0092
Rit	400	0,0156	-0,0053	0,0103	0,0009	0,0014
EPS	400	501,75	-258,35	243,40	37,5972	42,1102
Panel B: Accounting Variables						
Average Annual Operating Profit	400	1807,60	-1317,30	490,30	96,6705	119,1642
Total Sales	400	9778,40	30,50	9808,90	1504,2141	1636,5651
Net Profit	400	2018,40	-1347,10	671,30	64,8333	117,6694
Assets	400	6797,61	102,99	6900,60	1308,5117	1243,1575
Equity	400	2951,50	-84,90	2866,60	517,8993	503,4300
Total Liabilities	400	5715,60	21,10	5736,70	791,5450	912,7654
Debt	400	2758,70	0,00	2758,70	268,8221	414,5056
Average Market Level Accounting Performance	400	0,9522	-0,5289	0,4233	0,1219	0,0939
Operating Profit to Sales Ratio	400	1,0420	-0,6073	0,4347	0,1028	0,1079

Appendix 13. Descriptive statistics full sample 2010

Year	2010					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	140	0,0517	-0,0252	0,0266	0,0015	0,0092
Rit	140	0,0119	-0,0020	0,0099	0,0013	0,0014
EPS	140	148,60	-21,40	127,20	18,9331	29,4900
Panel B: Accounting Variables						
Average Annual Operating Profit	140	2153,00	-83,00	2070,00	118,6718	248,8060
Total Sales	140	42439,06	6,94	42446,00	1694,2736	3951,2146
Net Profit	140	1478,00	-124,00	1354,00	83,2878	185,7258
Assets	140	39115,75	7,25	39123,00	1704,2086	4029,0133
Equity	140	16315,90	-84,90	16231,00	689,2306	1685,4226
Total Liabilities	140	22887,44	4,56	22892,00	1014,9886	2381,7360
Debt	140	7382,00	0,00	7382,00	397,7576	933,1994
Average Market Level Accounting Performance	140	0,6054	-0,2510	0,3544	0,0973	0,0918
Operating Profit to Sales Ratio	140	1,2410	-0,3100	0,9310	0,0943	0,1311

Appendix 14. Descriptive statistics full sample 2011

Year	2011					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	140	0,1100	-0,0462	0,0638	0,0005	0,0188
Rit	140	0,0074	-0,0053	0,0021	-0,0005	0,0013
EPS	140	226,80	-60,70	166,10	22,0749	37,3408
Panel B: Accounting Variables						
Average Annual Operating Profit	140	3475,00	-1073,00	2402,00	100,0222	257,8630
Total Sales	140	38651,46	7,54	38659,00	1812,1649	3796,9099
Net Profit	140	3350,00	-1488,00	1862,00	64,2691	235,6429
Assets	140	36197,24	7,76	36205,00	1792,0196	3923,6221
Equity	140	13914,69	1,31	13916,00	712,9787	1601,7589
Total Liabilities	140	22284,21	4,79	22289,00	1078,5423	2368,0754
Debt	140	7770,00	0,00	7770,00	430,5251	979,9042
Average Market Level Accounting Performance	140	0,9522	-0,5289	0,4233	0,0978	0,1091
Operating Profit to Sales Ratio	140	1,4513	-0,6073	0,8440	0,0880	0,1375

Appendix 15. Descriptive statistics full sample 2012

Year	2012					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	140	0,0533	-0,0201	0,0332	0,0009	0,0083
Rit	140	0,0085	-0,0024	0,0062	0,0008	0,0013
EPS	140	215,800	-67,20	148,60	23,6609	36,5898
Panel B: Accounting Variables						
Average Annual Operating Profit	140	4164,000	-2303,00	1861,00	83,0839	311,7084
Total Sales	140	30166,680	9,32	30176,00	1832,0501	3334,0261
Net Profit	140	5292,000	-3789,00	1503,00	36,8701	384,0874
Assets	140	29942,150	6,85	29949,00	1818,3500	3613,7793
Equity	140	10824,000	-3,00	10821,00	709,3251	1361,0373
Total Liabilities	140	20498,140	3,86	20502,00	1112,1798	2324,4772
Debt	140	8777,000	0,00	8777,00	449,7883	1042,2695
Average Market Level Accounting Performance	140	0,5277	-0,1810	0,3467	0,0962	0,0890
Operating Profit to Sales Ratio	140	1,1753	-0,3803	0,7950	0,0919	0,1244

Appendix 16. Descriptive statistics full sample 2013

Year	2013					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	140	0,0461	-0,0245	0,0216	0,0009	0,0071
Rit	140	0,0127	-0,0023	0,0103	0,0011	0,0015
EPS	140	185,90	-16,70	169,20	22,0261	34,3961
Panel B: Accounting Variables						
Average Annual Operating Profit	140	2222,00	-510,00	1712,00	109,3746	204,1274
Total Sales	140	17453,31	8,69	17462,00	1692,2390	2432,3013
Net Profit	140	2282,00	-1003,00	1279,00	63,9216	192,0418
Assets	140	25182,84	8,16	25191,00	1781,9795	3350,4773
Equity	140	10661,31	0,69	10662,00	696,5514	1279,0629
Total Liabilities	140	18525,71	5,29	18531,00	1085,4417	2194,2451
Debt	140	9098,00	0,00	9098,00	461,3006	1107,6210
Average Market Level Accounting Performance	140	0,6676	-0,3680	0,2996	0,0927	0,0860
Operating Profit to Sales Ratio	140	0,8779	-0,1699	0,7080	0,0909	0,1105

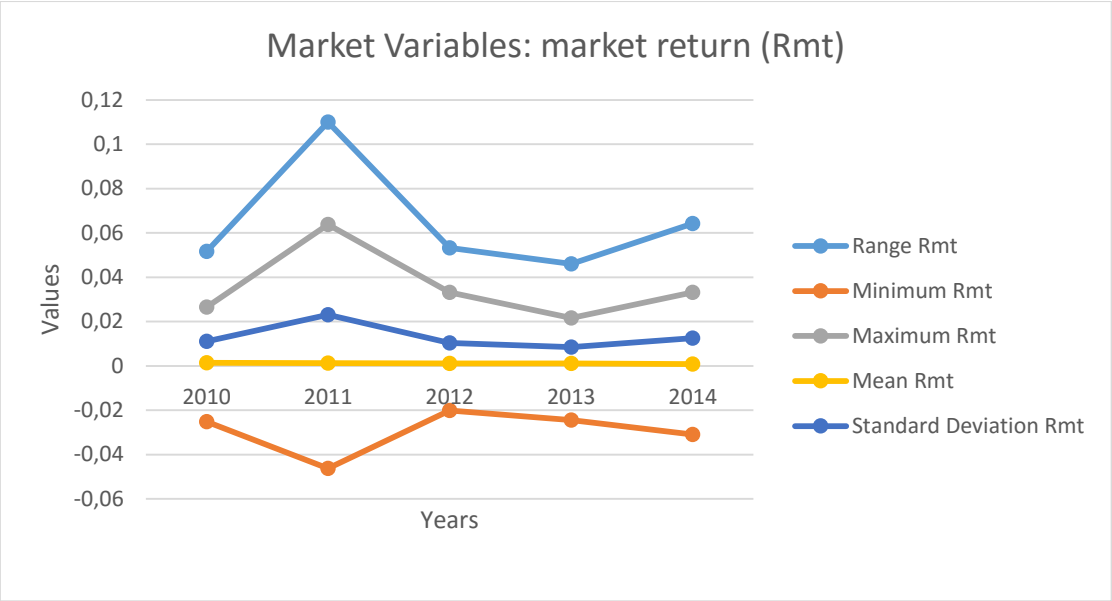
Appendix 17. Descriptive statistics full sample 2014

Year	2014					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	140	0,0642	-0,0310	0,0332	0,0005	0,0102
Rit	140	0,0068	-0,0037	0,0031	0,0001	0,0011
EPS	140	501,75	-258,35	243,40	21,8690	44,6010
Panel B: Accounting Variables						
Average Annual Operating Profit	140	4745,30	-1317,30	3428,00	108,4004	334,0632
Total Sales	140	15001,46	9,54	15011,00	1693,8787	2308,9478
Net Profit	140	4823,10	-1347,10	3476,00	105,4483	427,3328
Assets	140	21366,47	8,53	21375,00	1773,3804	2974,1461
Equity	140	11001,20	-66,20	10935,00	730,8069	1375,3146
Total Liabilities	140	12388,67	5,33	12394,00	1042,6316	1687,9780
Debt	140	6984,00	0,00	6984,00	412,4996	792,7803
Average Market Level Accounting Performance	140	0,6601	-0,3331	0,3270	0,0941	0,0889
Operating Profit to Sales Ratio	140	1,0551	-0,3331	0,7220	0,0927	0,1229

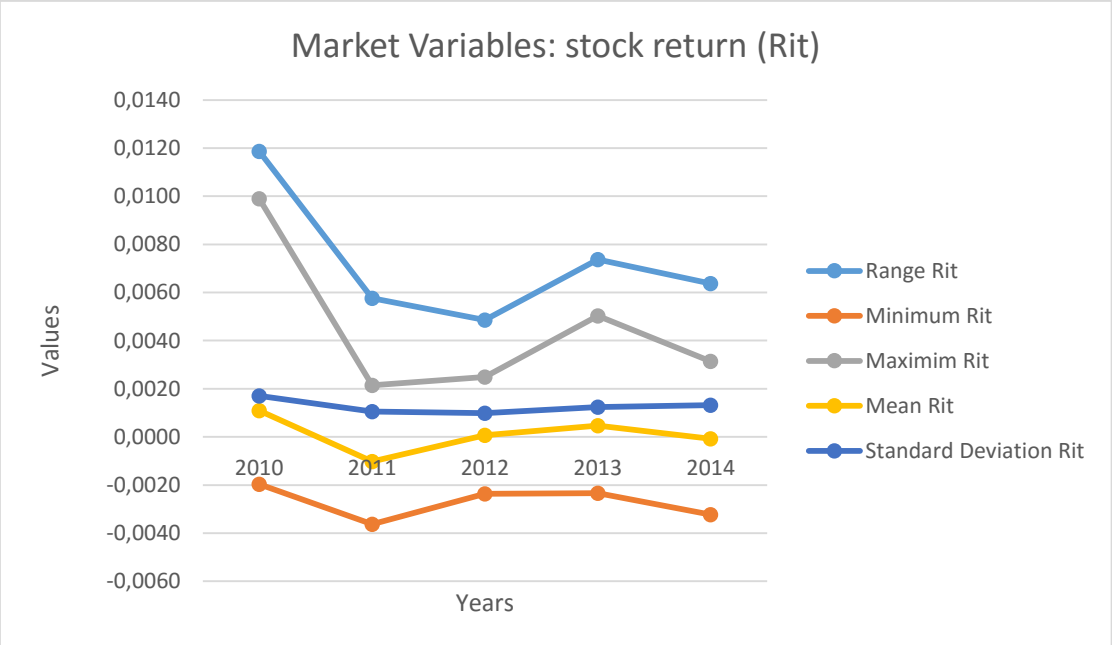
Appendix 18: Descriptive statistics full sample all years

Year	TOTAL					
	N	**Range**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**
Panel A: Market Variables						
Rmt	700	0,1100	-0,0462	0,0638	0,0009	0,0115
Rit	700	0,0156	-0,0053	0,0103	0,0006	0,0015
EPS	700	501,75	-258,35	243,40	21,7128	36,7374
Panel B: Accounting Variables						
Average Annual Operating Profit	700	5731,00	-2303,00	3428,00	103,9106	274,7275
Total Sales	700	42439,06	6,94	42446,00	1744,9213	3228,3729
Net Profit	700	7265,00	-3789,00	3476,00	70,7594	302,3323
Assets	700	39116,15	6,85	39123,00	1773,9876	3588,7341
Equity	700	16315,90	-84,90	16231,00	707,7785	1464,6162
Total Liabilities	700	22888,14	3,86	22892,00	1066,7568	2200,6415
Debt	700	9098,00	0,00	9098,00	430,3742	974,4878
Average Market Level Accounting Performance	700	0,9522	-0,5289	0,4233	0,0956	0,0931
Operating Profit to Sales Ratio	700	1,5383	-0,6073	0,9310	0,0916	0,1253

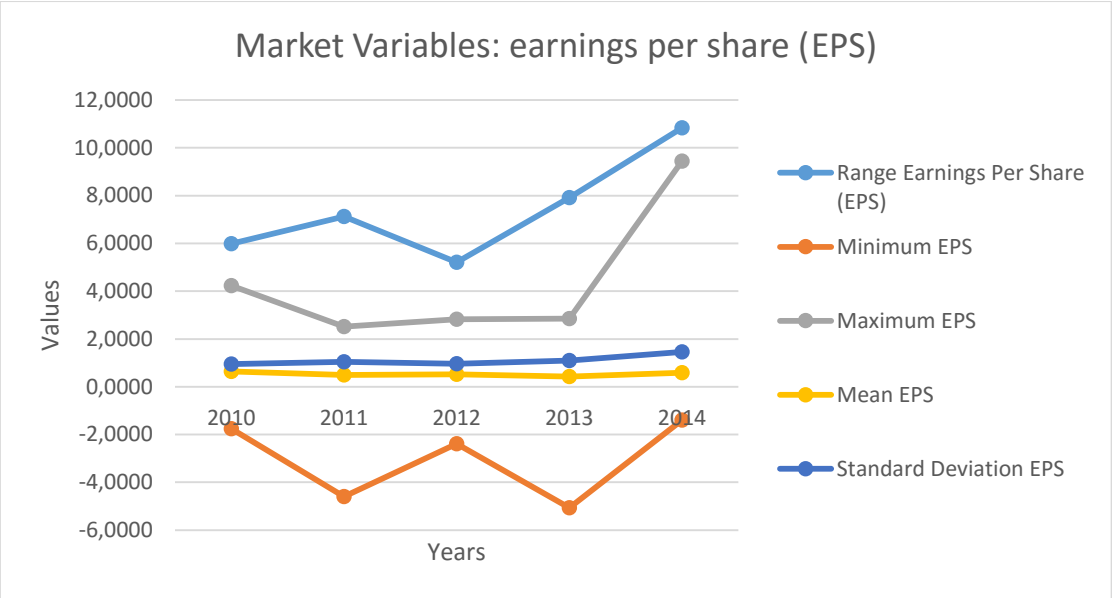
Appendix 19. Descriptive statistics Finland, market: market return



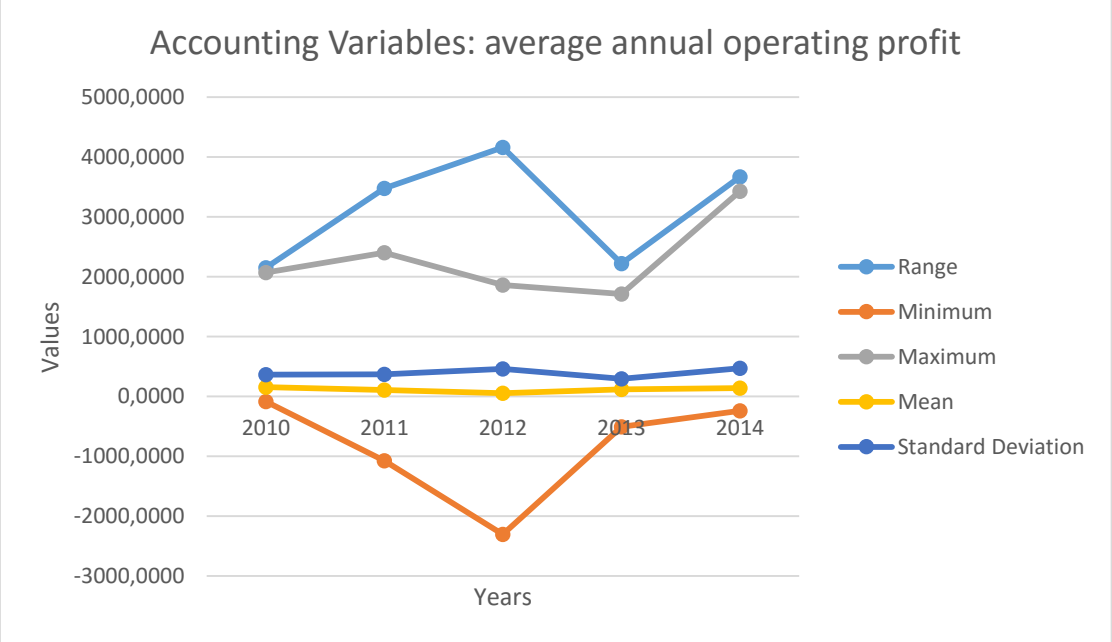
Appendix 20. Descriptive statistics Finland, market: stock return



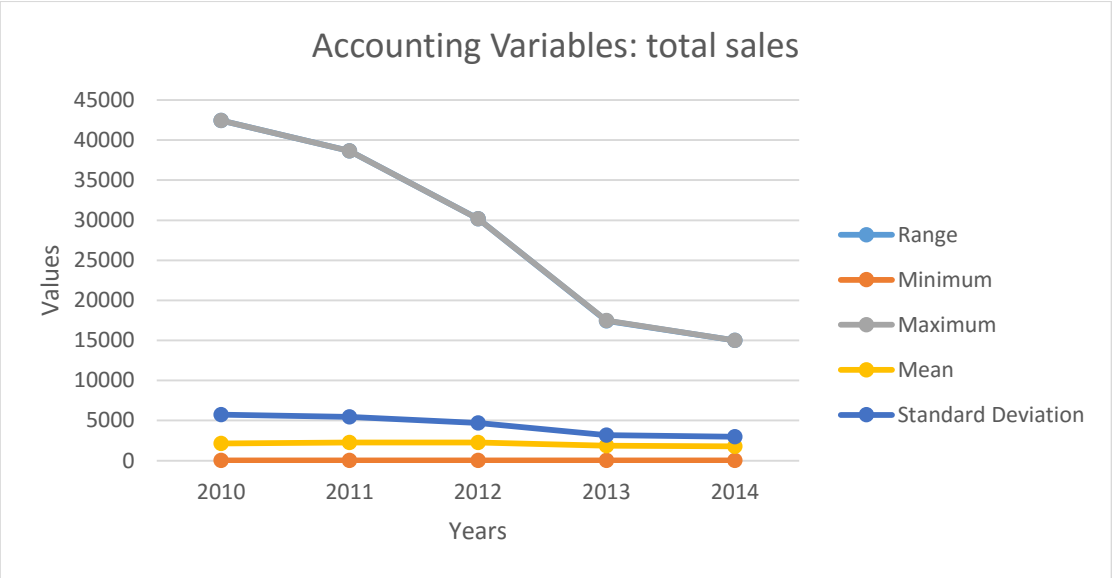
Appendix 21. Descriptive statistics Finland, market: earnings per share



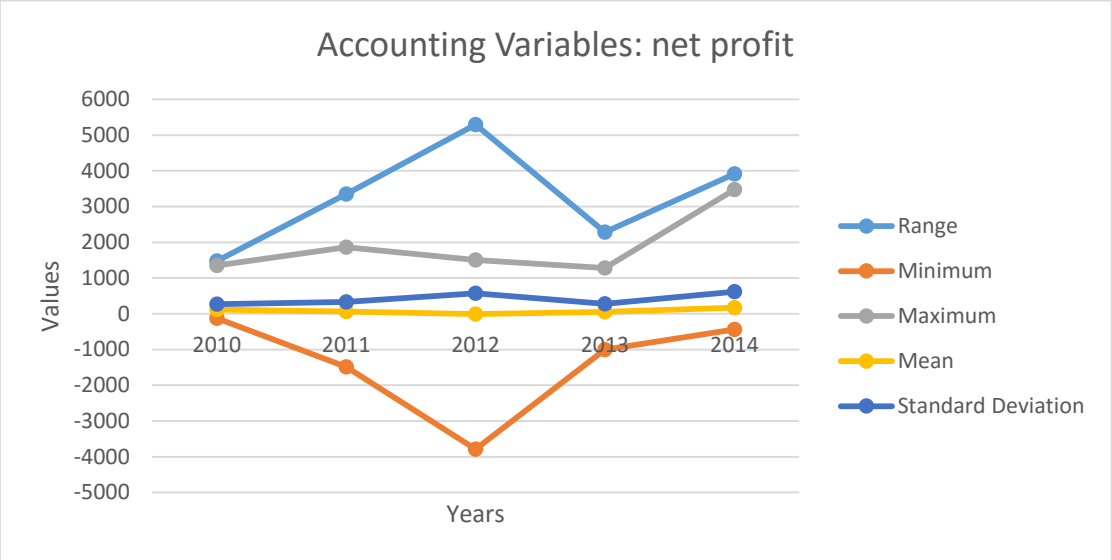
Appendix 22. Descriptive statistics Finland, accounting: operating profit



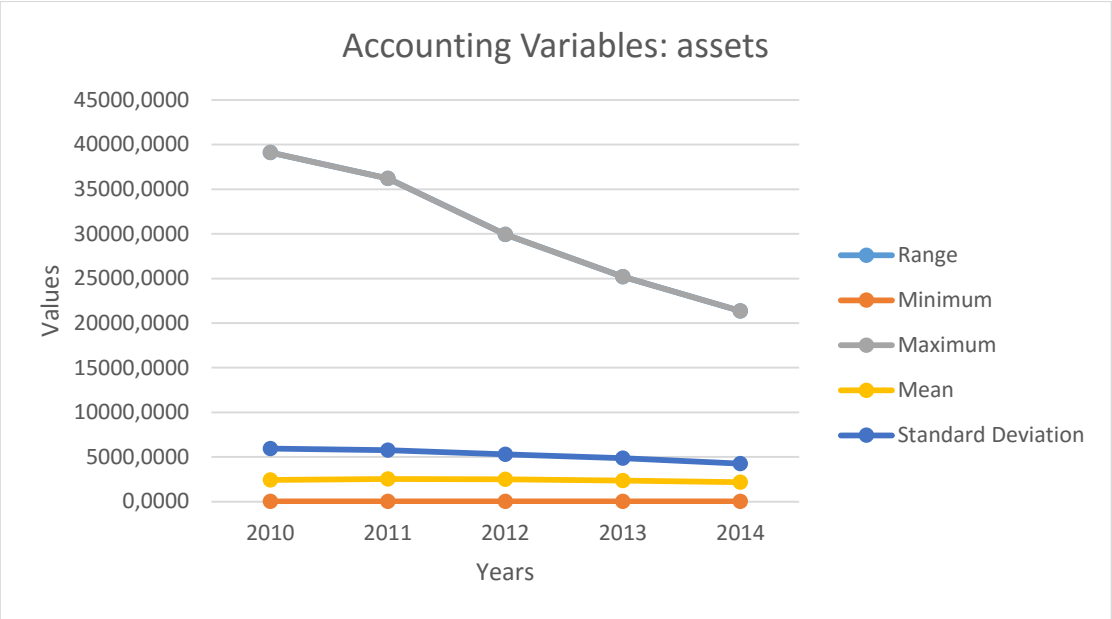
Appendix 23. Descriptive statistics Finland, accounting: total sales



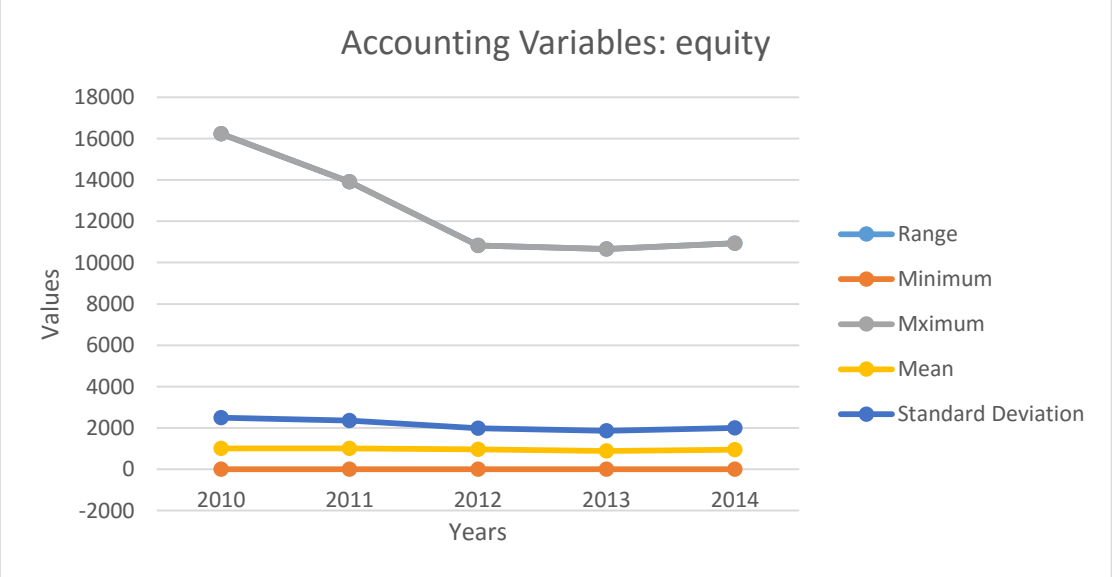
Appendix 24. Descriptive statistics Finland, accounting: net profit



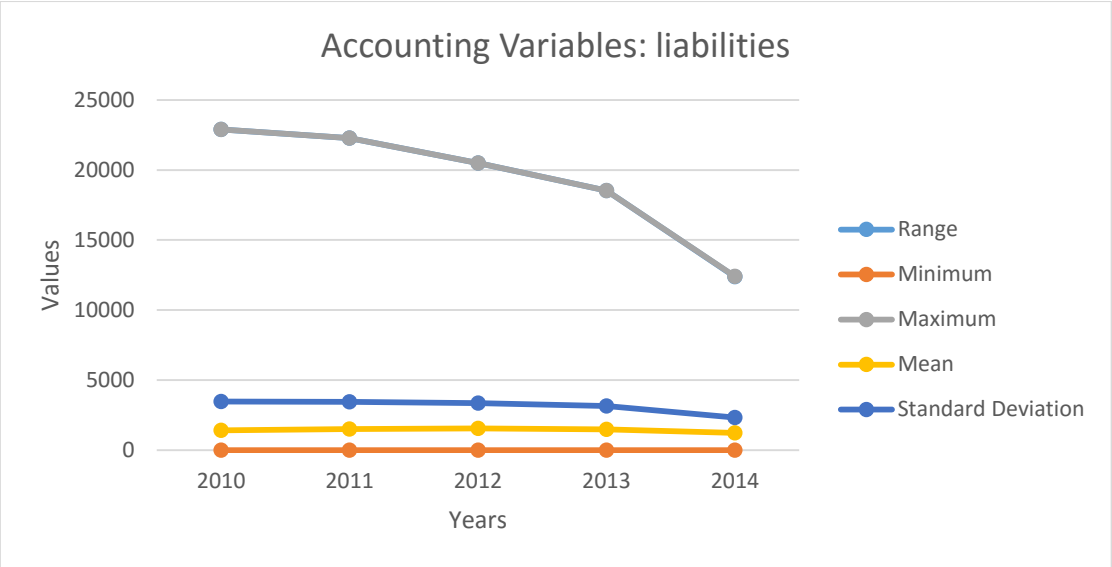
Appendix 25. Descriptive statistics Finland, accounting: assets



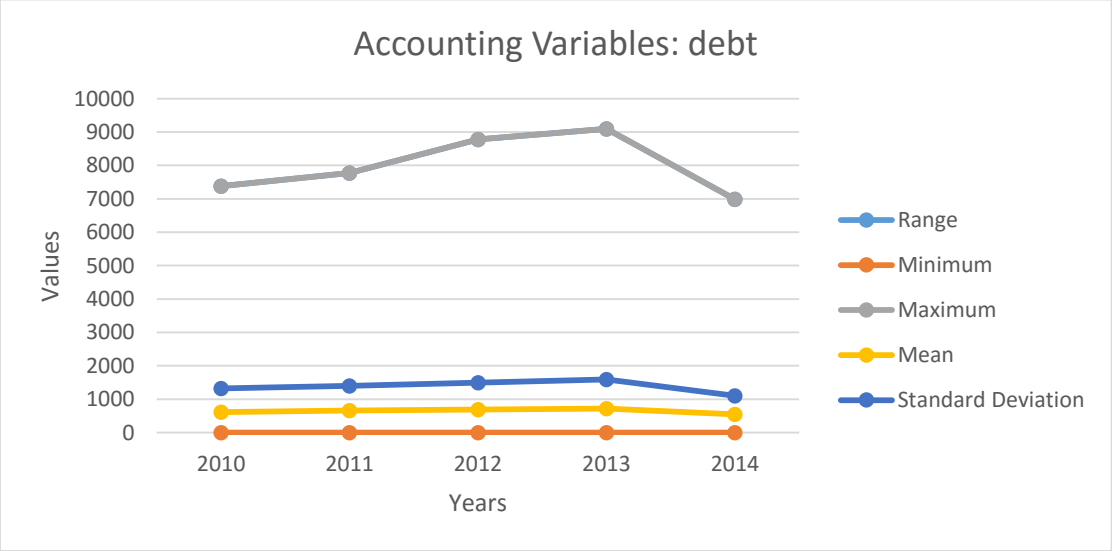
Appendix 26. Descriptive statistics Finland, accounting: equity



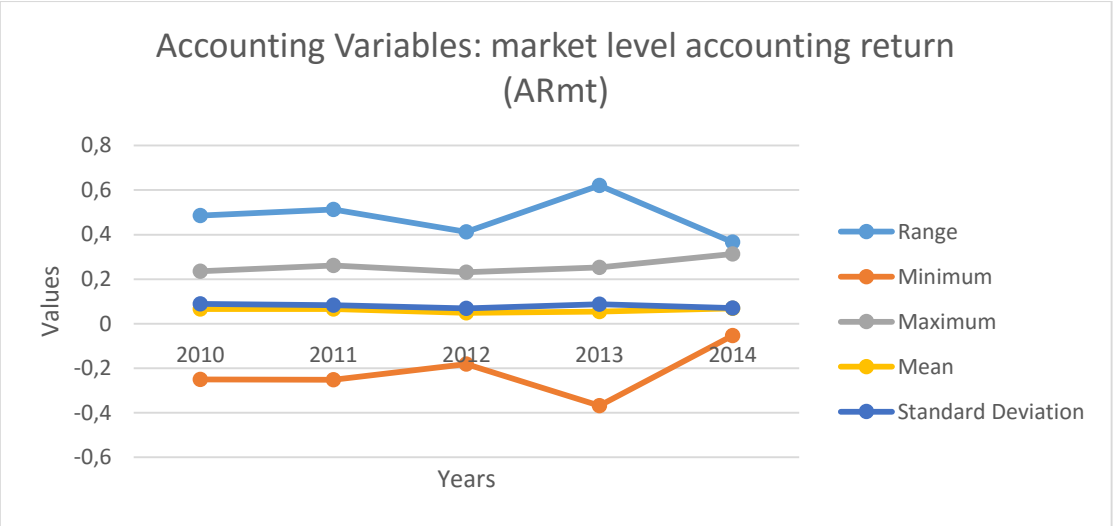
Appendix 27. Descriptive statistics Finland, accounting: liabilities



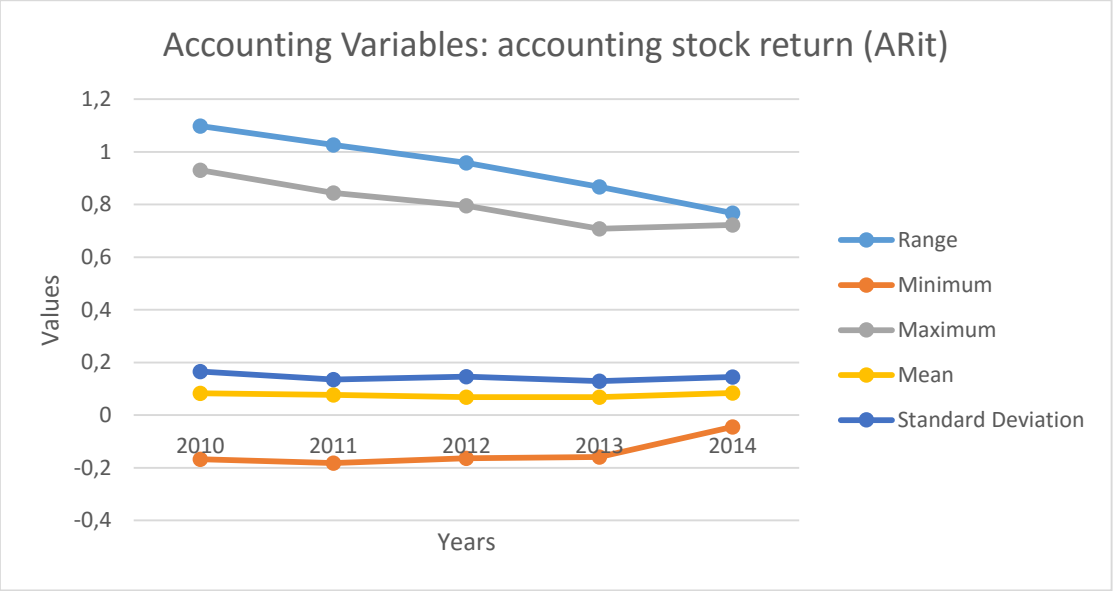
Appendix 28. Descriptive statistics Finland, accounting: debt



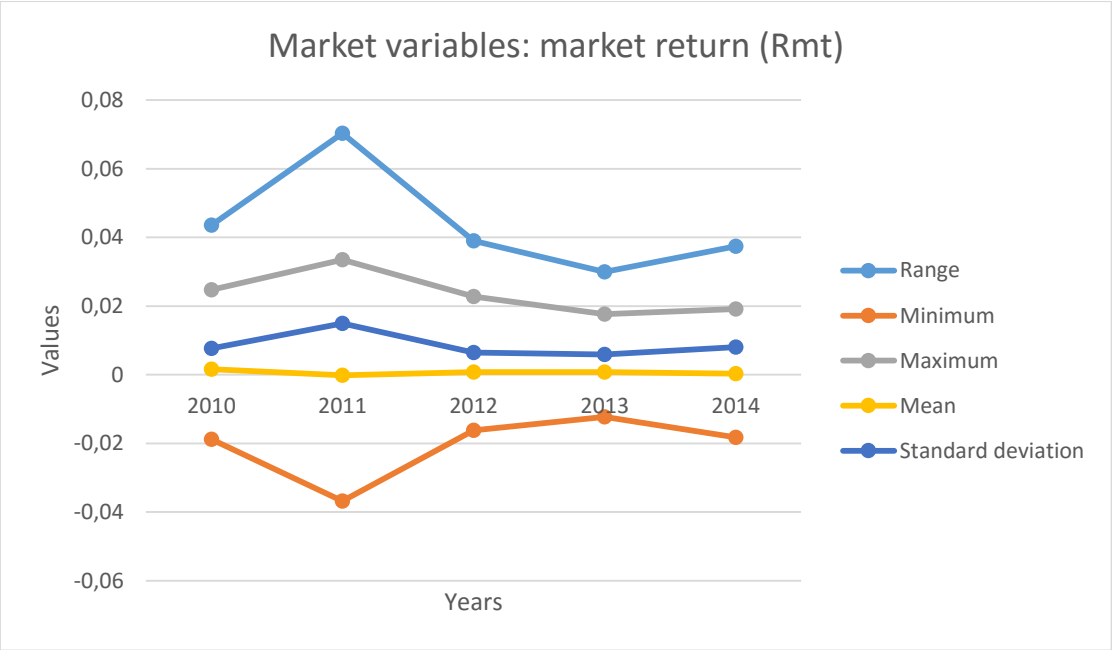
Appendix 29. Descriptive statistics Finland, accounting: market level accounting return



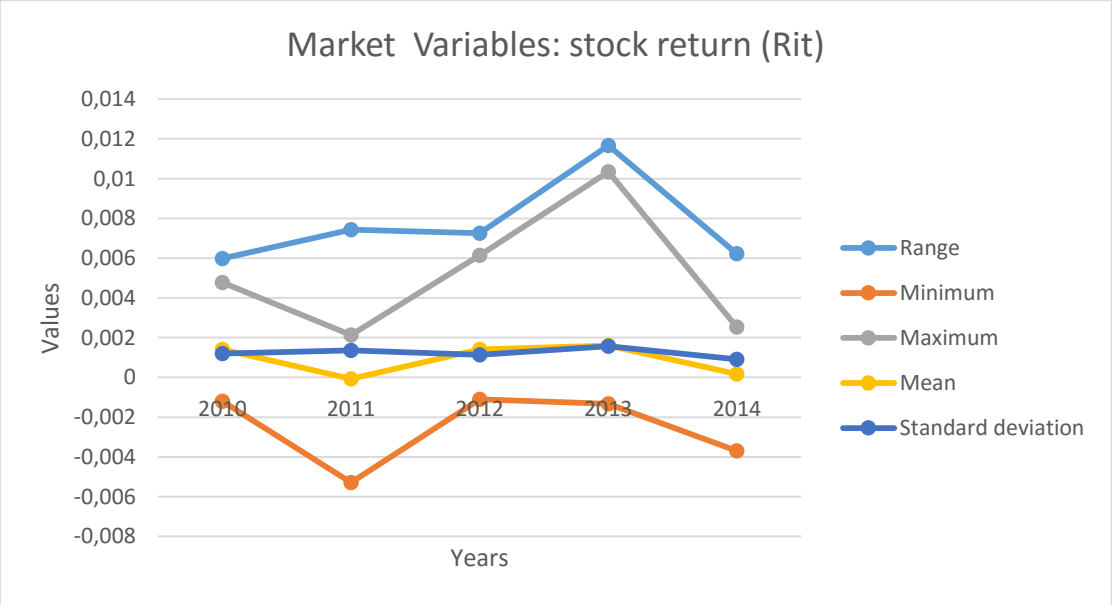
Appendix 30. Descriptive statistics Finland, accounting: accounting stock return



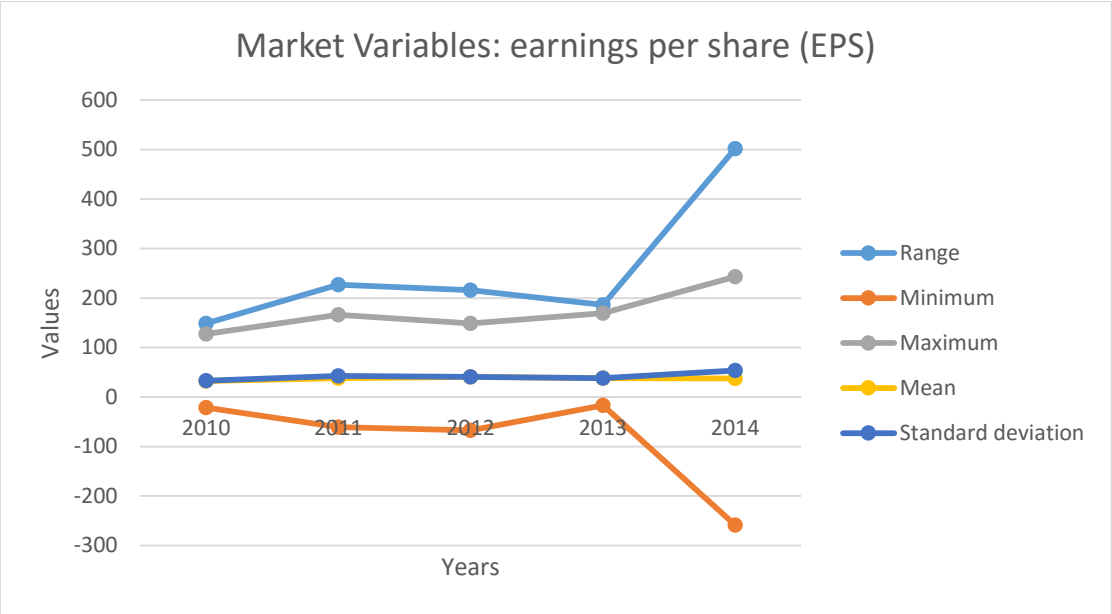
Appendix 31. Descriptive statistics UK, market: market return



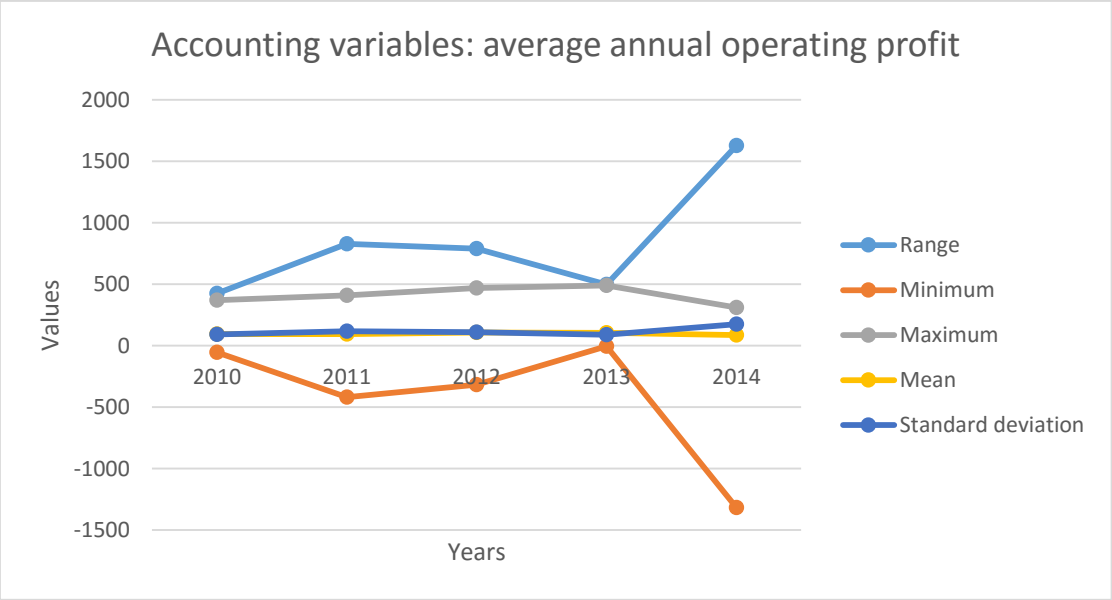
Appendix 32. Descriptive statistics UK, market: stock return



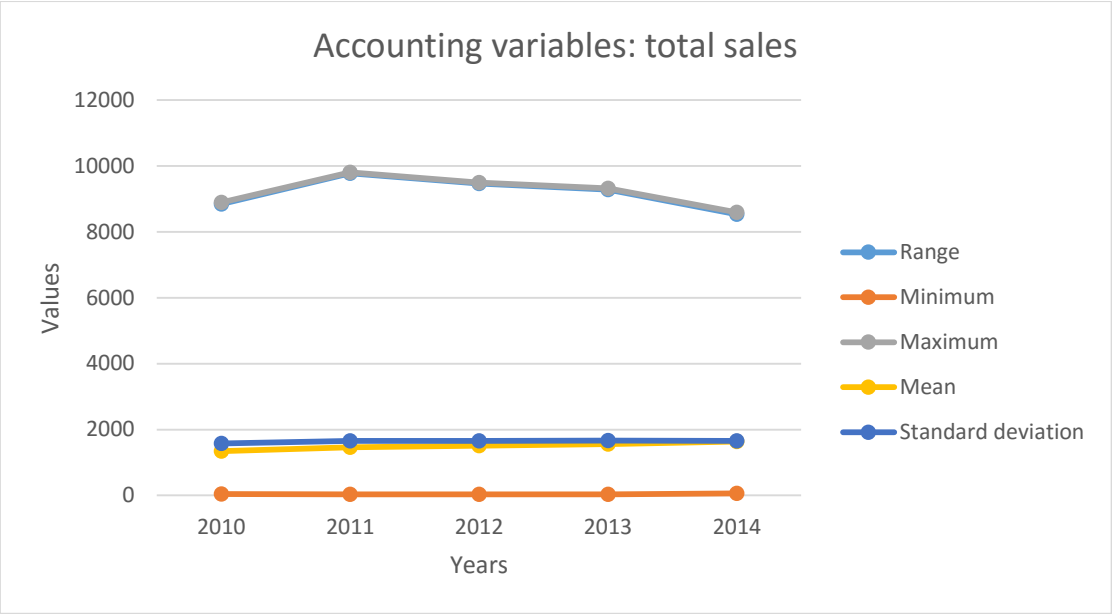
Appendix 33. Descriptive statistics UK, market: earnings per share



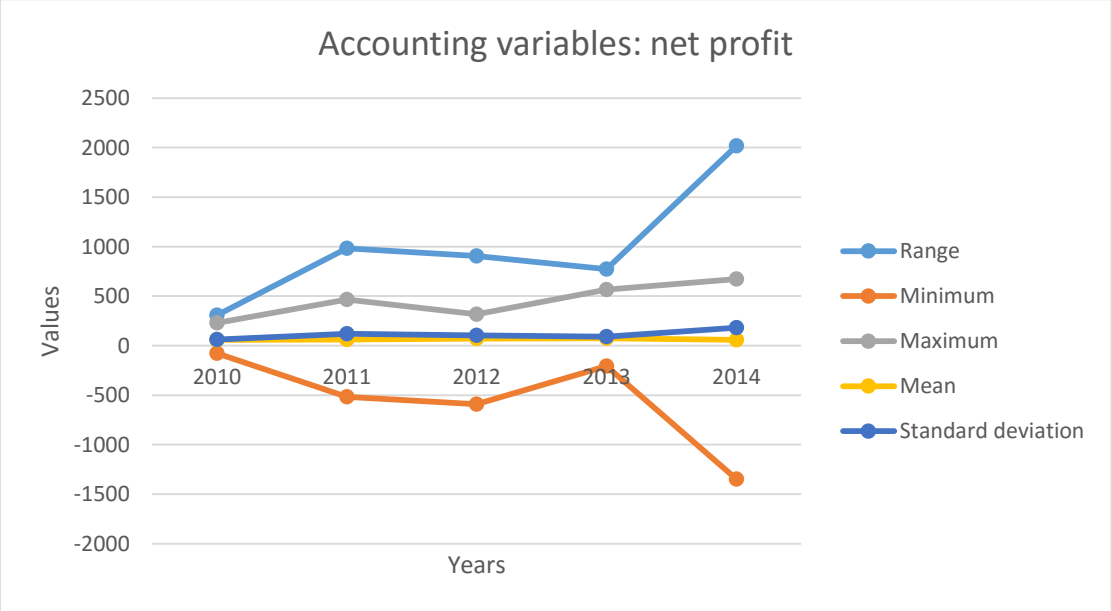
Appendix 34. Descriptive statistics UK, accounting: operating profit



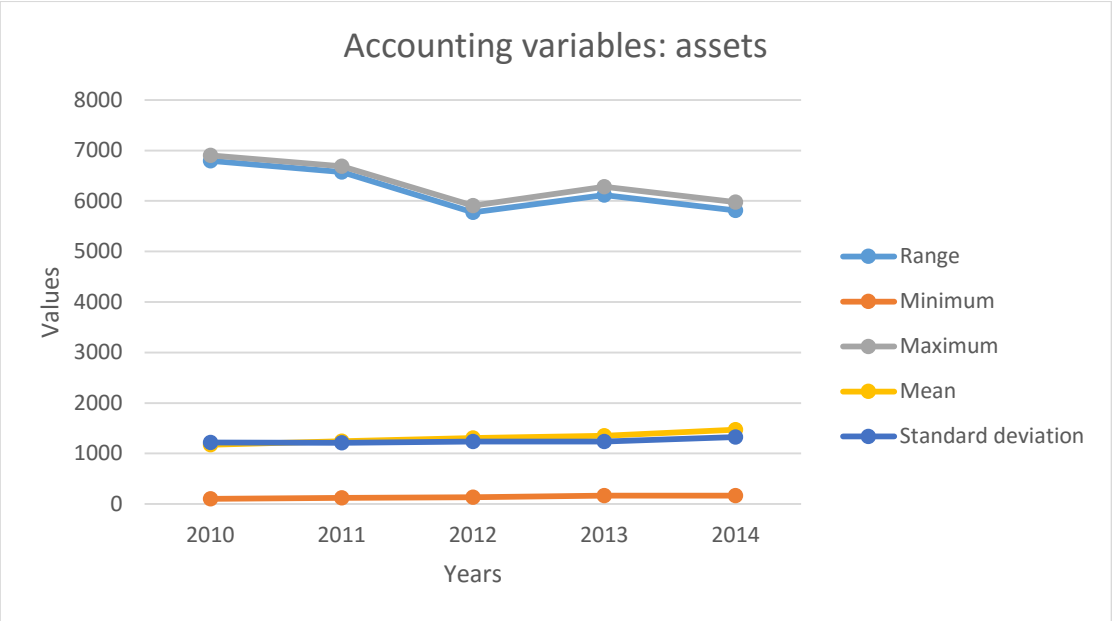
Appendix 35. Descriptive statistics UK, accounting: total sales



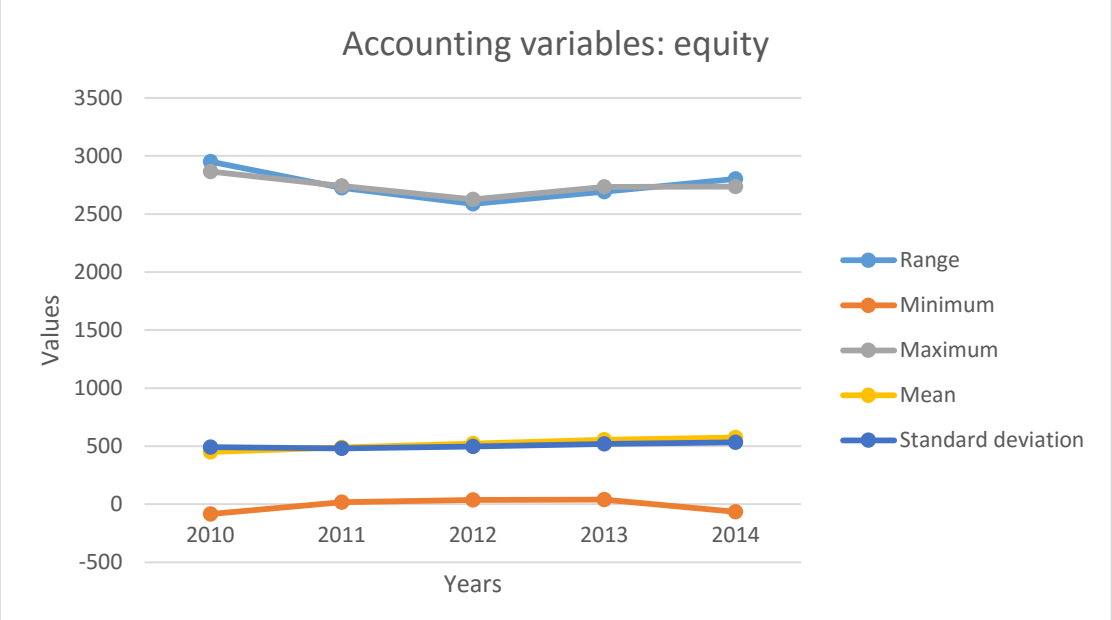
Appendix 36. Descriptive statistics UK, accounting: net profit



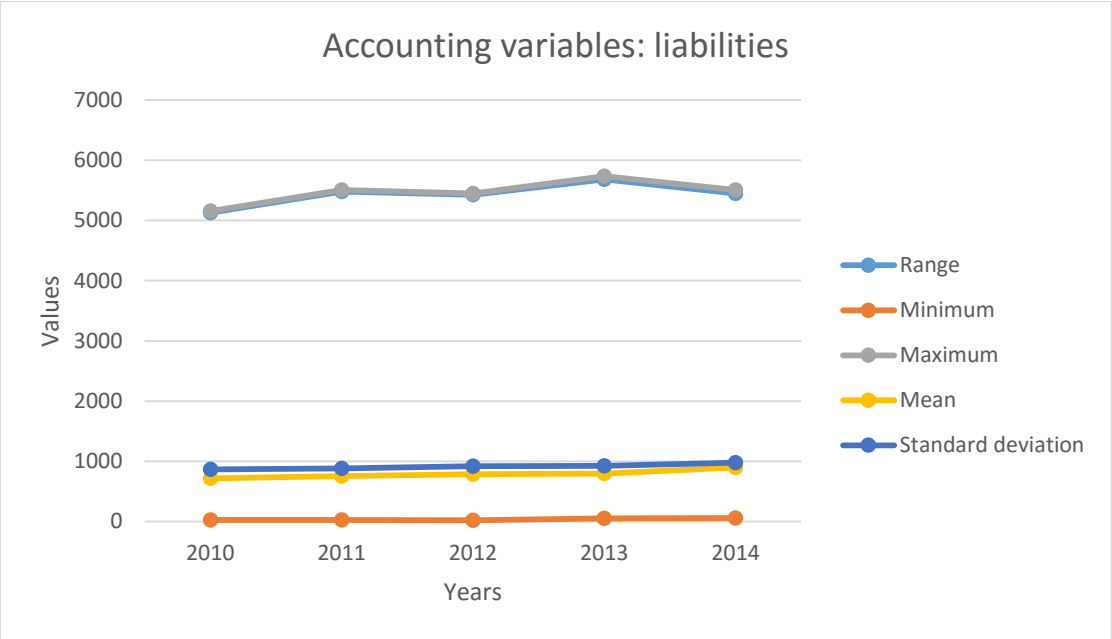
Appendix 37: Descriptive statistics UK, accounting: assets



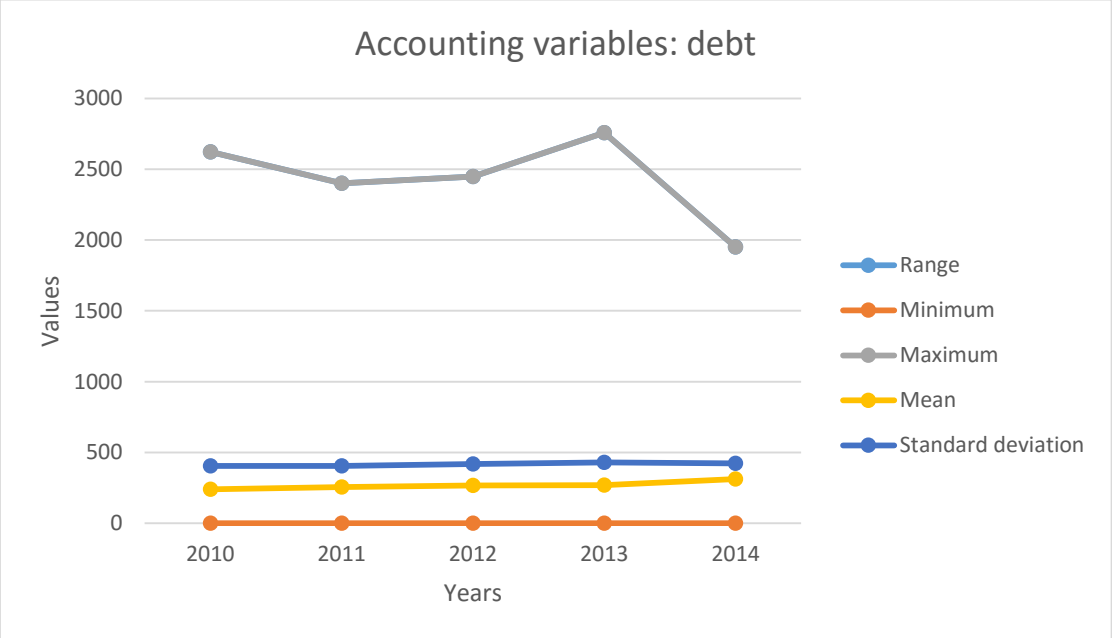
Appendix 38. Descriptive statistics UK, accounting: equity



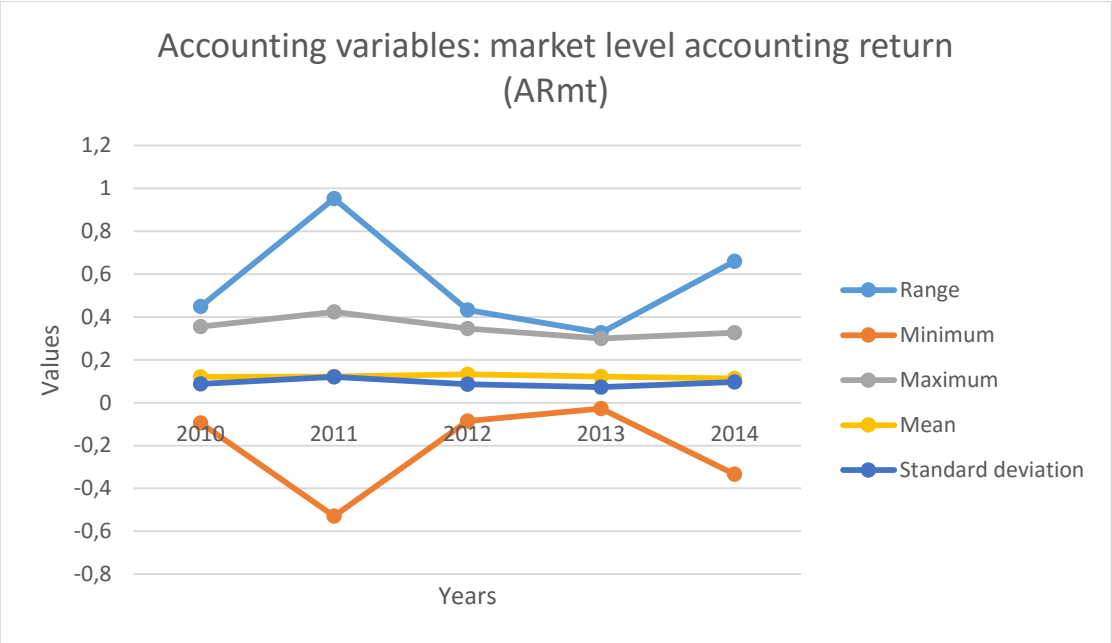
Appendix 39. Descriptive statistics UK, accounting: liabilities



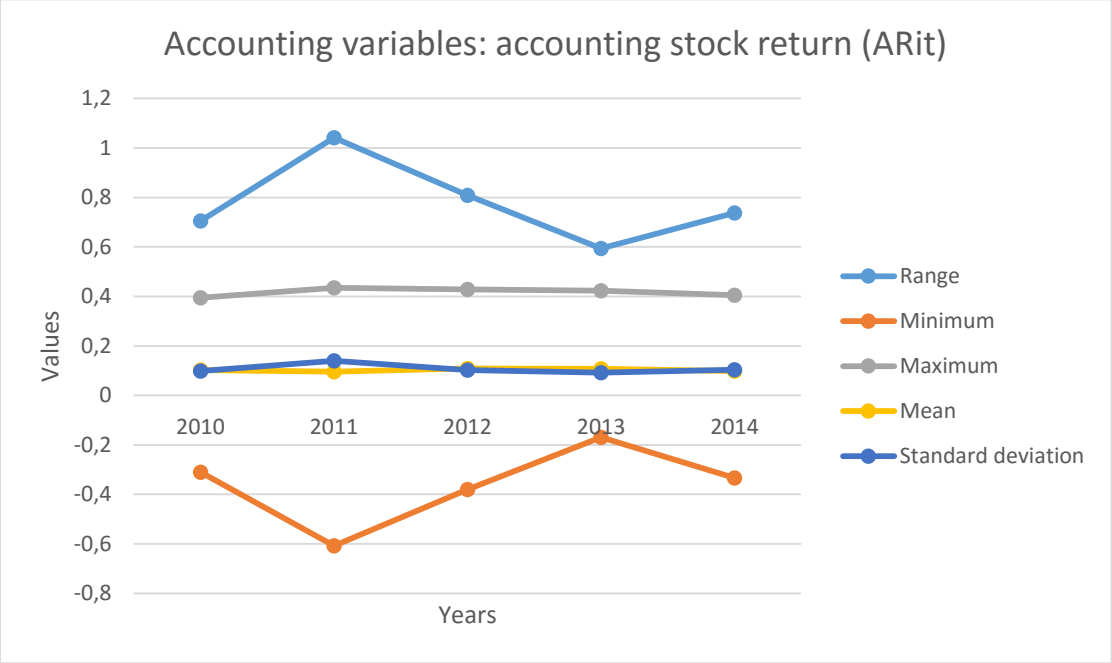
Appendix 40. Descriptive statistics UK, accounting: debt



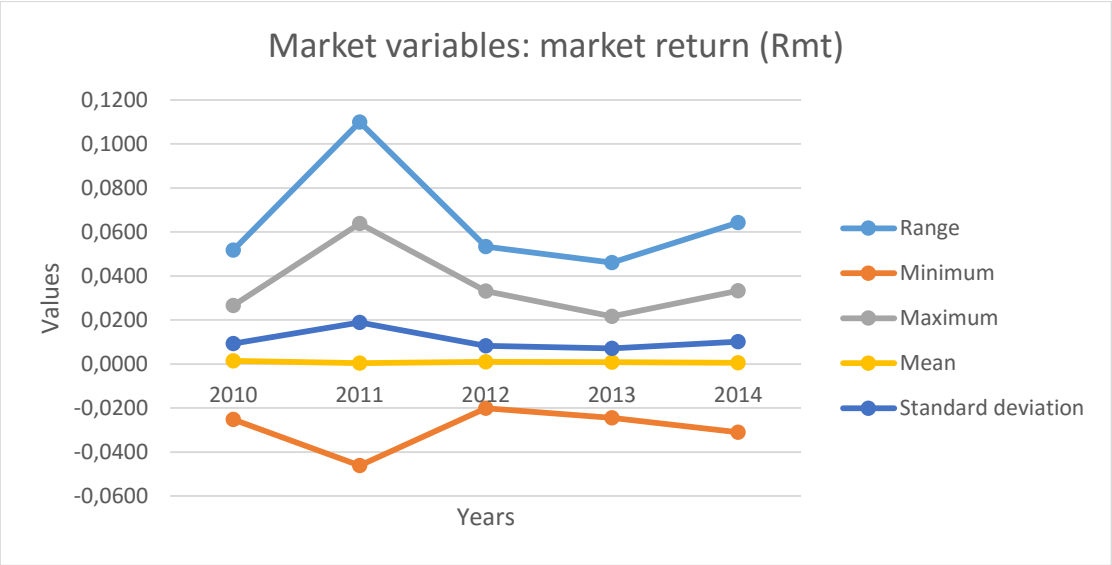
Appendix 41. Descriptive statistics UK, accounting: market level accounting return



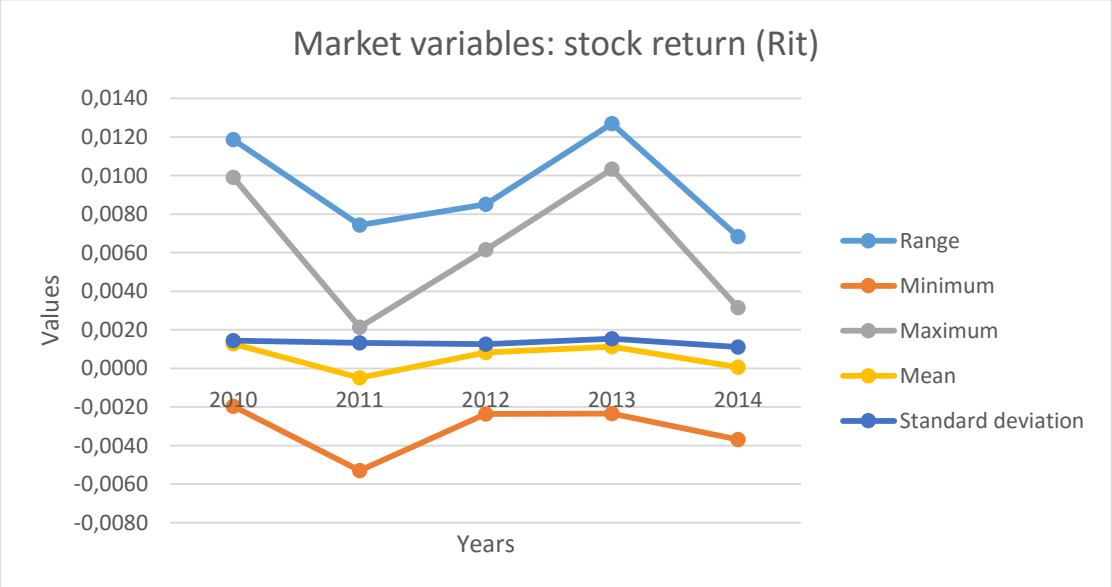
Appendix 42. Descriptive statistics UK, accounting: accounting stock return



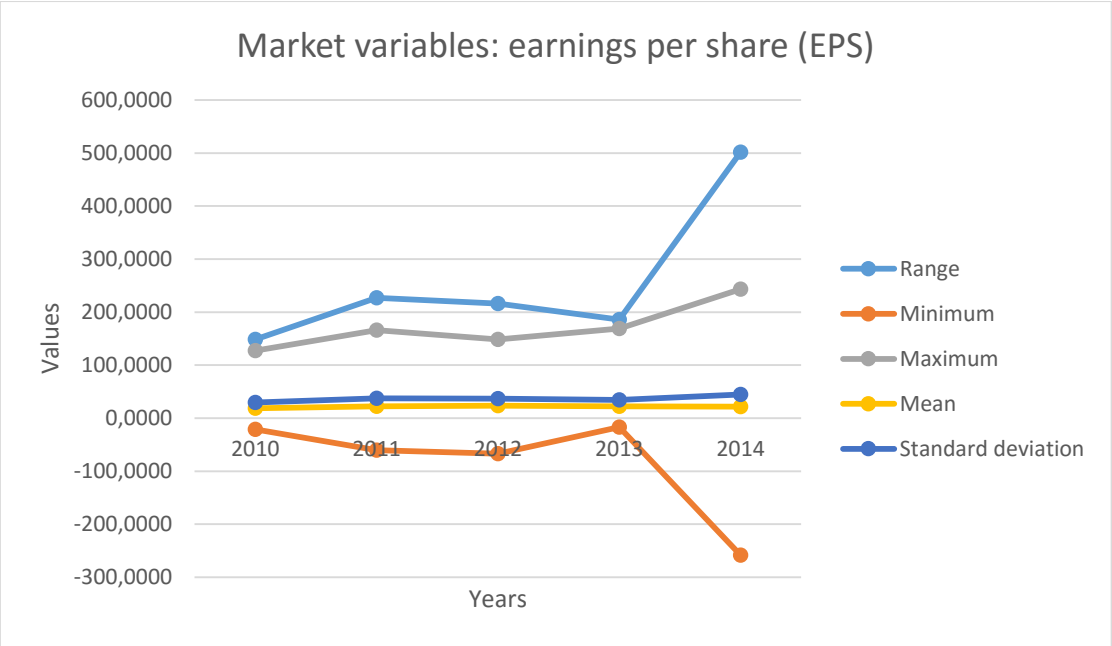
Appendix 43. Descriptive statistics full sample, market: market return



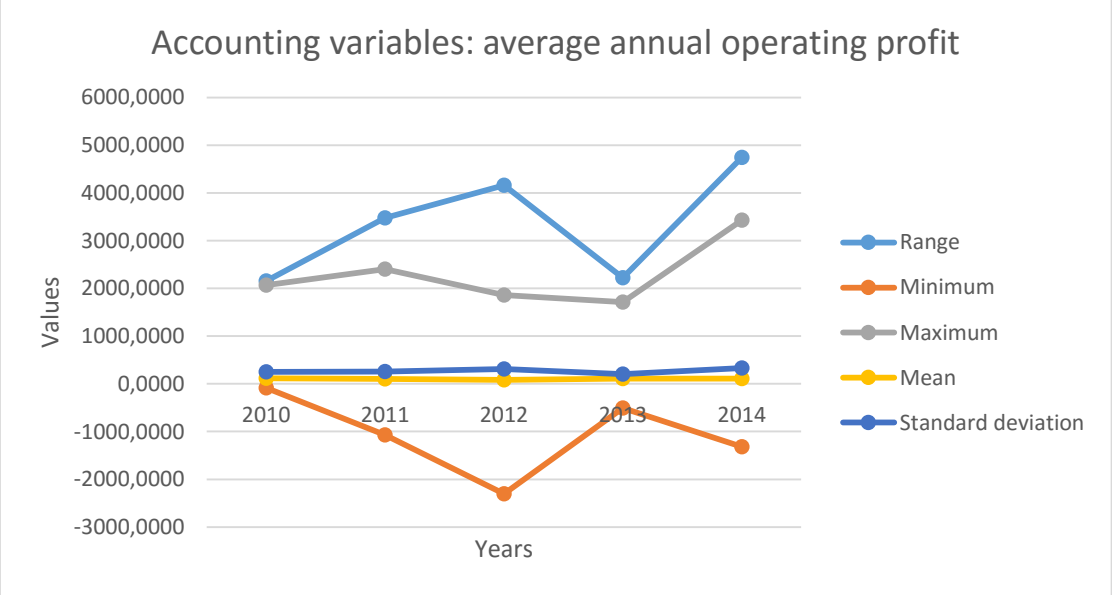
Appendix 44. Descriptive statistics full sample, market: stock return



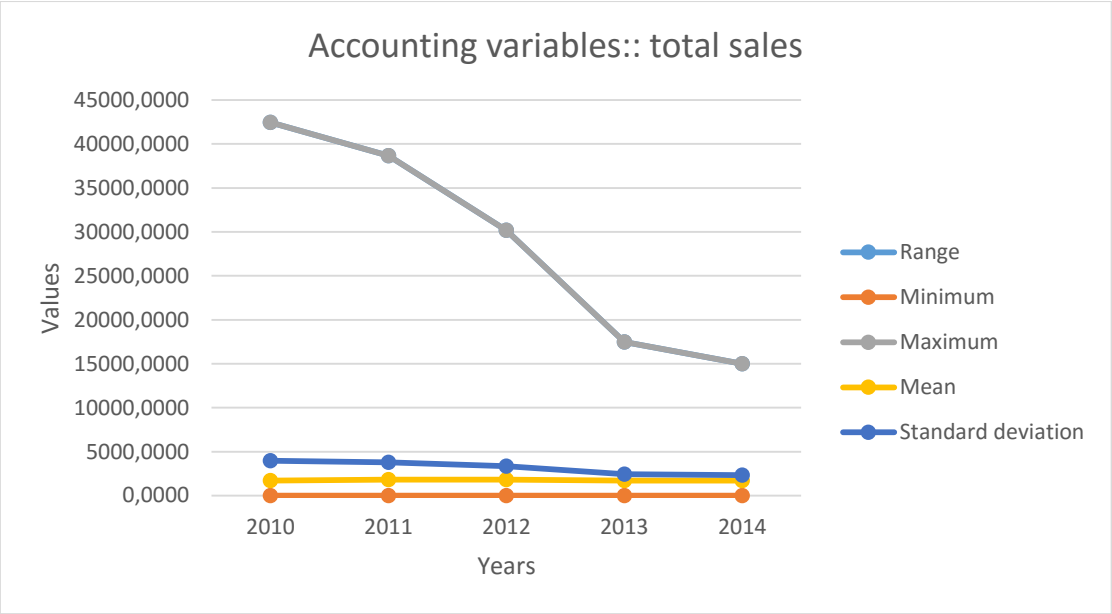
Appendix 45. Descriptive statistics full sample, market: earnings per share



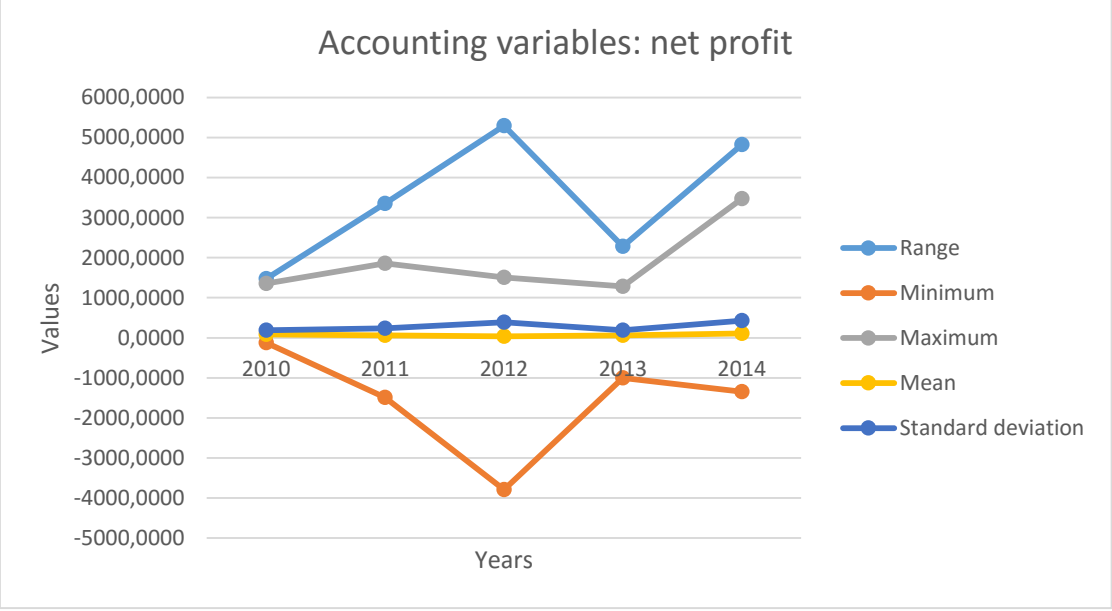
Appendix 46. Descriptive statistics full sample, accounting: operating profit



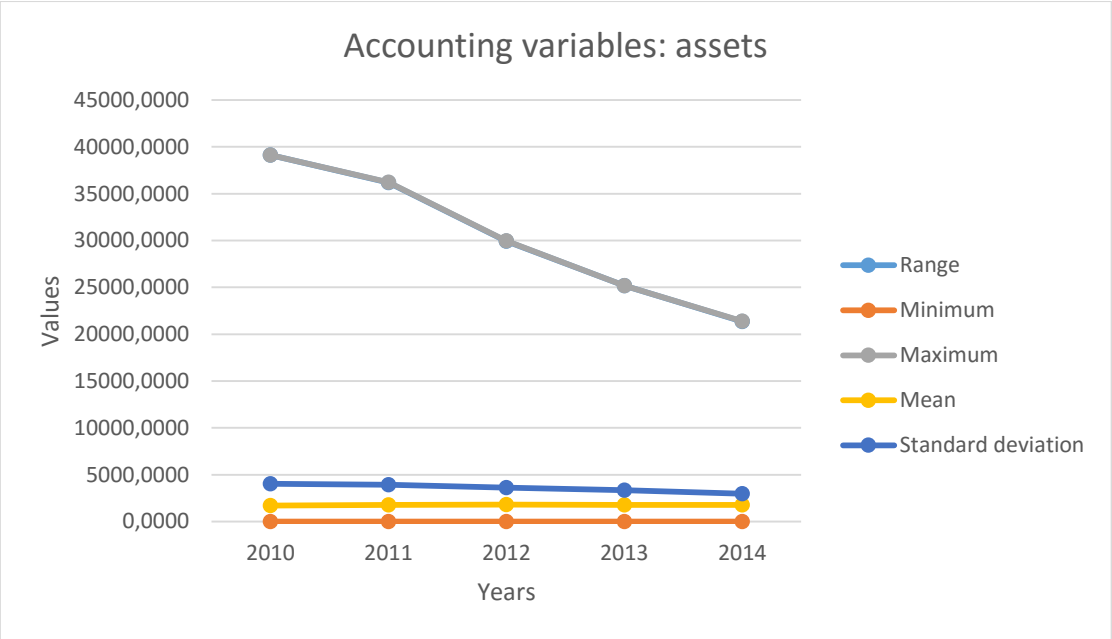
Appendix 47. Descriptive statistics full sample, accounting: total sales



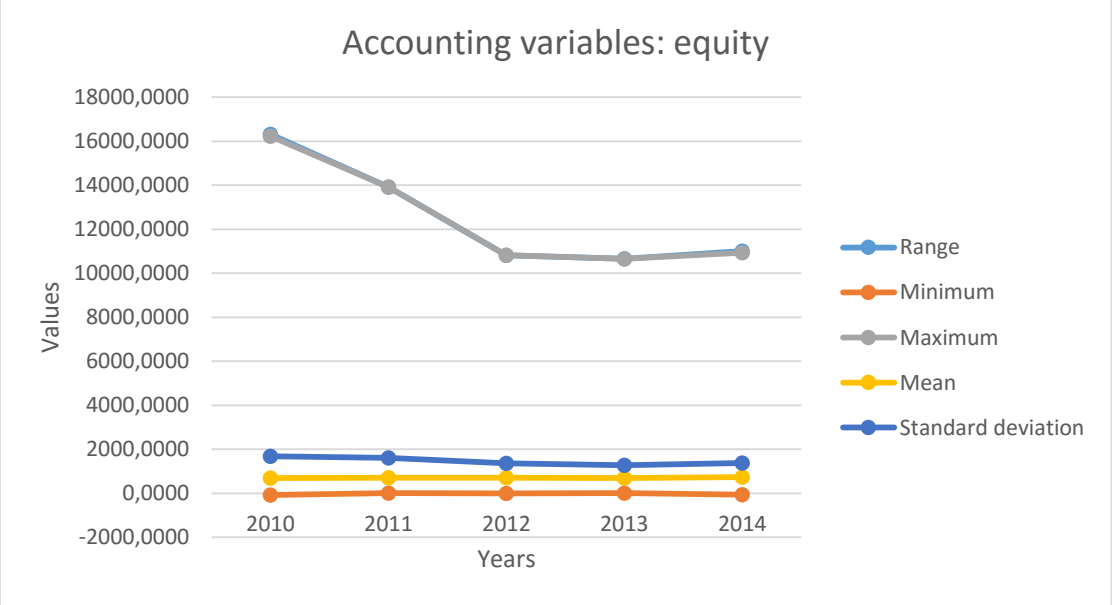
Appendix 48. Descriptive statistics full sample, accounting: net profit



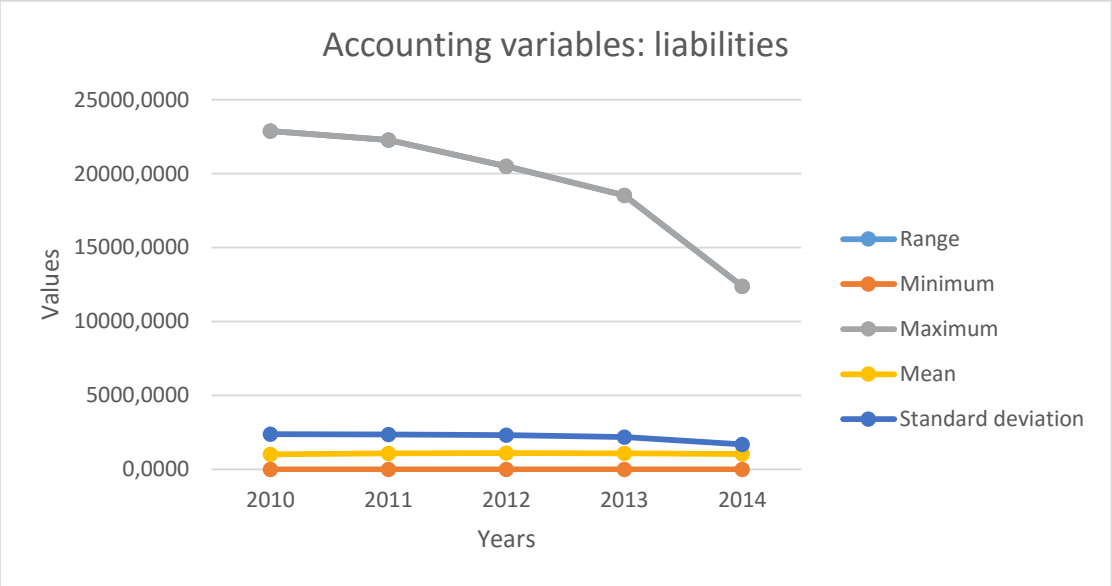
Appendix 49. Descriptive statistics full sample, accounting: assets



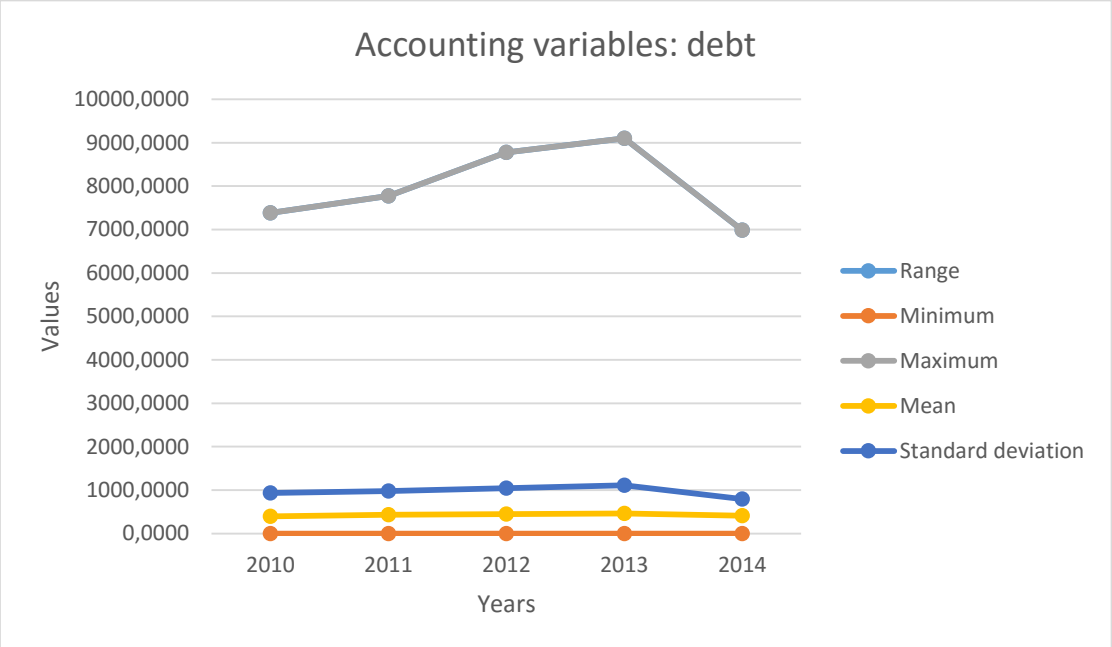
Appendix 50. Descriptive statistics full sample, accounting: equity



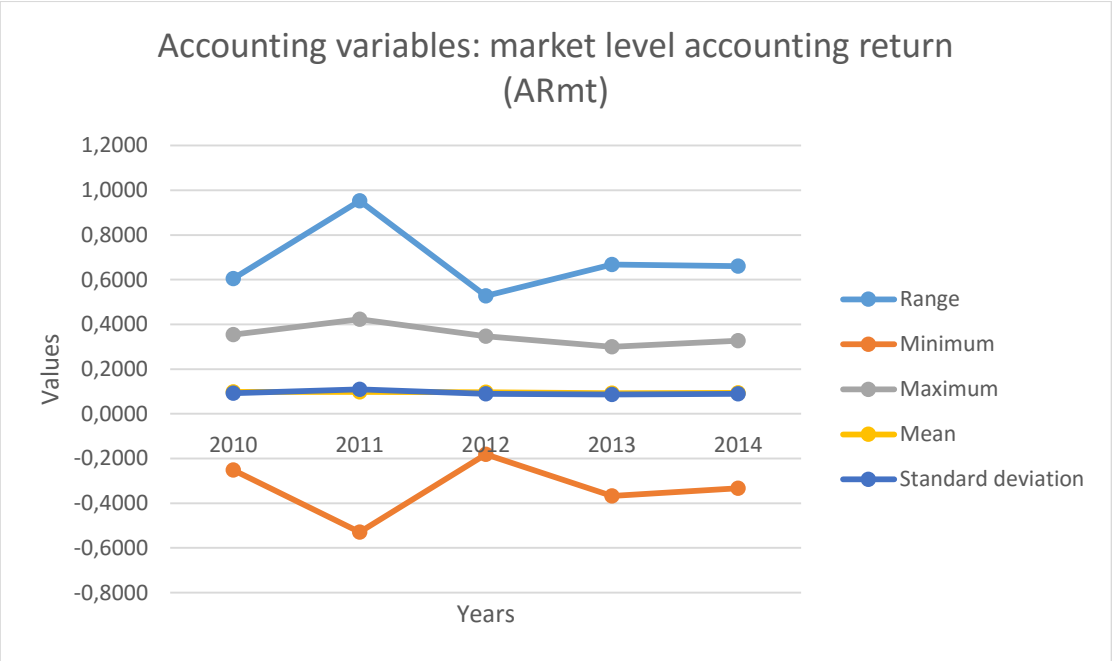
Appendix 51. Descriptive statistics full sample, accounting: liabilities



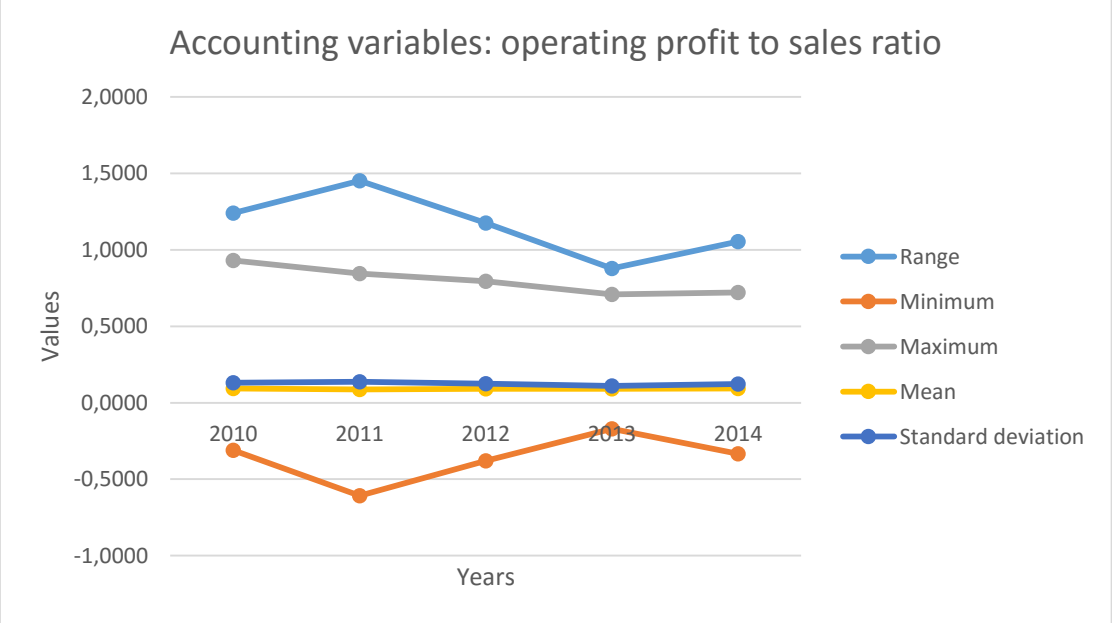
Appendix 52. Descriptive statistics full sample, accounting: debt



Appendix 53. Descriptive statistics full sample, accounting: market level accounting return



Appendix 54. Descriptive statistics full sample, accounting: accounting stock return



Appendix 55. Correlation Finland 2010, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,016	1					
Operating Profit/ Sales Ratio	0,159**	0,081ψ	1				
Log of Sales	-0,043	-0,035	0	1			
Log of Assets	0,289**	0,005	0,160**	0,582**	1		
EPS	0,188**	0,023	0,264**	0,293**	0,199**	1	
D/E Ratio	-0,105*	-0,008	-0,073ψ	-0,053	-0,079ψ	-0,172**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 56. Correlation Finland 2010, accounting

	Accounting stock Return (ARit-Rft)	market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,630**	1				
Log of Sales	0,017	0,213*	1			
Log of Assets	0,273*	0,282*	0,945**	1		
EPS	0,195ψ	0,491**	0,465**	0,448**	1	
D/E Ratio	-0,028	-0,406**	-0,036	0,001	-0,348**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 57. Correlation Finland 2011, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,091	1					
Operating Profit/ Sales Ratio	0,335**	0,075	1				
Log of Sales	-0,166ψ	-0,150ψ	-0,019	1			
Log of Assets	-0,118	-0,117	0,234*	0,941**	1		
EPS	0,435**	-0,099	0,354**	0,375**	0,378**	1	
D/E Ratio	-0,046	-0,063	-0,114	-0,124	-0,147	-0,247*	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 58. Correlation Finland 2011, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return(ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc.return (ARmt-Rft)	0,660**	1				
Log of Sales	-0,02	0,048	1			
Log of Assets	0,233*	0,111	0,941**	1		
EPS	0,354**	0,638**	0,374**	0,377**	1	
D/E Ratio	-0,114	-0,252*	-0,124	-0,147	-0,247*	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 59. Correlation Finland 2012, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	-0,018	1					
Operating Profit/ Sales Ratio	0,162ψ	0,2ψ	1				
Log of Sales	0,176ψ	0,046	-0,039	1			
Log of Assets	0,146ψ	0,118	0,215*	0,938**	1		
EPS	0,436**	0,164ψ	0,303**	0,31**	0,293**	1	
D/E Ratio	-0,005	-0,064	0,085	0,168ψ	0,216*	-0,136	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 60. Correlation Finland 2012, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,608**	1				
Log of Sales	-0,039	0,032	1			
Log of Assets	0,215*	0,083	0,938**	1		
EPS	0,304**	0,665**	0,310**	0,293**	1	
D/E Ratio	0,085	-0,012	0,168ψ	0,216*	-0,136	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 61. Correlation Finland 2013, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,031	1					
Operating Profit/ Sales Ratio	0,126*	0,087ψ	1				
Log of Sales	-0,032	-0,056	0,003	1			
Log of Assets	0,278**	-0,011	0,154**	0,583**	1		
EPS	0,159**	0,034	0,280**	0,250**	0,156**	1	
D/E Ratio	-0,105*	0,033	-0,112*	-0,076ψ	-0,088ψ	-0,155**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 62. Correlation Finland 2013, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,610**	1				
Log of Sales	0,036	0,200ψ	1			
Log of Assets	0,295**	0,268*	0,934**	1		
EPS	0,265*	0,493**	0,211*	0,219*	1	
D/E Ratio	-0,226*	-0,672**	-0,146ψ	-0,179ψ	-0,136	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 63. Correlation Finland 2014, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,024	1					
Operating Profit/ Sales Ratio	0,138**	0,11*	1				
Log of Sales	-0,037	-0,056	-0,002	1			
Log of Assets	0,246**	-0,014	0,163**	0,580**	1		
EPS	0,158**	0,032	0,273**	0,242**	0,173**	1	
D/E Ratio	-0,088$^{\psi}$	0,003	-0,074$^{\psi}$	-0,051	-0,082$^{\psi}$	-0,149**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
$^{\psi}$ - Correlation is significant at 0,1 level (2-tailed)

Appendix 64. Correlation Finland 2014, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,64**	1				
Log of Sales	0,012	0,011	1			
Log of Assets	0,292**	0,095	0,931**	1		
EPS	0,241*	0,367**	0,191$^{\psi}$	0,262*	1	
D/E Ratio	-0,004	-0,18$^{\psi}$	-0,01	0,003	-0,177$^{\psi}$	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
$^{\psi}$ - Correlation is significant at 0,1 level (2-tailed)

Appendix 65. Correlation Finland all years, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,016	1					
Operating Profit/ Sales Ratio	0,159**	0,081ψ	1				
Log of Sales	-0,043	-0,035	0	1			
Log of Assets	0,289**	0,005	0,160**	0,582**	1		
EPS	0,188**	0,023	0,264**	0,293**	0,199**	1	
D/E Ratio	-0,105*	-0,008	-0,073ψ	-0,053	-0,079ψ	-0,172**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 66. Correlation Finland all years, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return(ARmt-Rft)	0,624**	1				
Log of Sales	0	0,106*	1			
Log of Assets	0,259**	0,173**	0,938**	1		
EPS	0,264**	0,504**	0,293**	0,307**	1	
D/E Ratio	-0,074ψ	-0,308**	-0,053	-0,056	-0,172**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 67. Correlation UK 2010, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,005	1					
Operating Profit/ Sales Ratio	0,151ψ	-0,136ψ	1				
Log of Sales	-0,299**	0,002	-0,257**	1			
Log of Assets	-0,311**	-0,035	-0,087	0,804**	1		
EPS	0,371**	0,046	0,368**	-0,003	-0,091	1	
D/E Ratio	0,023	0,089	0,171ψ	-0,028	0,056	0,062	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 68. Correlation UK 2010, accounting

	Accounting Stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,869**	1				
Log of Sales	-0,257**	-0,303**	1			
Log of Assets	-0,087	-0,319**	0,804**	1		
EPS	0,368**	0,432**	-0,003	-0,091	1	
D/E Ratio	0,171ψ	0,178ψ	-0,028	0,056	0,062	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 69. Correlation UK 2011, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	-0,068	1					
Operating Profit/ Sales Ratio	0,103	0,075	1				
Log of Sales	-0,247**	-0,025	-0,118	1			
Log of Assets	-0,189*	0	-0,073	0,791**	1		
EPS	0,287**	-0,004	0,439**	0,027	-0,058	1	
D/E Ratio	-0,08	-0,173$^{\psi}$	0,019	0,117	0,12	0,041	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
$^{\psi}$ - Correlation is significant at 0,1 level (2-tailed)

Appendix 70. Correlation UK 2011, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,913**	1				
Log of Sales	-0,118	-0,211*	1			
Log of Assets	-0,073	-0,292**	0,791**	1		
EPS	0,439**	0,494**	0,027	-0,058	1	
D/E Ratio	0,019	-0,001	0,117	0,12	0,041	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
$^{\psi}$ - Correlation is significant at 0,1 level (2-tailed)

Appendix 71. Correlation UK 2012, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	-0,031	1					
Operating Profit/ Sales Ratio	0,006	0,263**	1				
Log of Sales	-0,061	-0,255**	-0,248**	1			
Log of Assets	-0,105	-0,05	-0,063	0,780**	1		
EPS	-0,262**	0,023	0,325**	0,013	-0,061	1	
D/E Ratio	-0,064	-0,094	-0,022	0,164ψ	0,179ψ	-0,026	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 72. Correlation UK 2012, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,815**	1				
Log of Sales	-0,248**	-0,333**	1			
Log of Assets	-0,063	-0,377**	0,780**	1		
EPS	0,325**	0,412**	0,013	-0,061	1	
D/E Ratio	-0,022	-0,064	0,164ψ	0,179ψ	-0,026	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 73. Correlation UK 2013, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,106	1					
Operating Profit/ Sales Ratio	-0,179ψ	-0,052	1				
Log of Sales	-0,006	-0,308**	-0,386**	1			
Log of Assets	-0,131ψ	-0,238*	-0,131ψ	0,772**	1		
EPS	-0,154ψ	-0,082	0,399**	-0,032	-0,071	1	
D/E Ratio	0,053	-0,04	-0,07	0,177ψ	0,176ψ	-0,009	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 74. Correlation UK 2013, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,858**	1				
Log of Sales	-0,386**	-0,401**	1			
Log of Assets	-0,131ψ	-0,369**	0,772**	1		
EPS	0,399**	0,486**	-0,032	-0,071	1	
D/E Ratio	-0,07	-0,102	0,177ψ	0,176ψ	-0,009	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 75. Correlation UK 2014, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,165ψ	1					
Operating Profit/ Sales Ratio	0,194*	-0,112	1				
Log of Sales	-0,203*	0,09	-0,472**	1			
Log of Assets	-0,305**	0,014	-0,278**	0,778**	1		
EPS	0,316**	-0,038	0,553**	-0,188*	-0,218*	1	
D/E Ratio	0,387**	0,052	0,325**	0,05	0,103	0,504**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 76. Correlation UK 2014, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,887**	1				
Log of Sales	-0,472**	-0,439**	1			
Log of Assets	-0,278**	-0,475**	0,778**	1		
EPS	0,553**	0,618**	-0,188*	-0,218*	1	
D/E Ratio	0,325**	0,341**	0,05	0,103	0,504**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 77. Correlation UK all years, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,034	1					
Operating Profit/ Sales Ratio	0,059ψ	0,023	1				
Log of Sales	-0,145**	-0,070ψ	-0,274**	1			
Log of Assets	-0,184**	-0,043	-0,118**	0,788**	1		
EPS	0,079ψ	-0,013	0,421**	-0,039	-0,099*	1	
D/E Ratio	0,003	-0,073ψ	0,077ψ	0,091*	0,12**	0,126**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 78. Correlation UK all years, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,874**	1				
Log of Sales	-0,274**	-0,321**	1			
Log of Assets	-0,118**	-0,356**	0,788**	1		
EPS	0,421**	0,493**	-0,039	-0,099*	1	
D/E Ratio	0,077ψ	0,073ψ	0,091*	0,120**	0,126**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 79. Correlation full sample 2010, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,427**	1					
Operating Profit/ Sales Ratio	-0,015	-0,076	1				
Log of Sales	-0,18*	-0,009	-0,061	1			
Log of Assets	-0,14*	-0,011	0,174*	0,902**	1		
EPS	-0,457**	-0,223**	0,217**	0,085	0,036	1	
D/E Ratio	0,136*	0,098	0,076	-0,044	0,009	-0,033	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ᵠ - Correlation is significant at 0,1 level (2-tailed)

Appendix 80. Correlation full sample, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,698**	1				
Log of Sales	-0,066	0,018	1			
Log of Assets	0,170*	0,062	0,902**	1		
EPS	0,197**	0,406**	0,085	0,036	1	
D/E Ratio	0,081	0,026	-0,044	0,009	-0,033	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ᵠ - Correlation is significant at 0,1 level (2-tailed)

Appendix 81. Correlation full sample 2011, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,273**	1					
Operating Profit/ Sales Ratio	-0,015	0,051	1				
Log of Sales	-0,189**	-0,142*	-0,052	1			
Log of Assets	-0,161*	-0,113ψ	0,109ψ	0,896**	1		
EPS	-0,426**	-0,145*	0,329**	0,091	0,046	1	
D/E Ratio	0,01	-0,101ψ	-0,033	-0,009	-0,029	0,011	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 82. Correlation full sample, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,807**	1				
Log of Sales	-0,057	-0,051	1			
Log of Assets	0,104ψ	-0,048	0,896**	1		
EPS	0,312**	0,469**	0,091	0,046	1	
D/E Ratio	-0,032	-0,081	-0,009	-0,029	0,011	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 83. Correlation full sample 2012, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,495**	1					
Operating Profit/ Sales Ratio	-0,136ψ	0,105ψ	1				
Log of Sales	-0,131ψ	-0,122ψ	-0,087	1			
Log of Assets	-0,127ψ	-0,014	0,144*	0,893**	1		
EPS	-0,575**	-0,272**	0,261**	0,093	0,056	1	
D/E Ratio	-0,044	-0,08	0,024	0,151*	0,171*	-0,002	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 84. Correlation full sample 2012, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,672**	1				
Log of Sales	-0,093	-0,061	1			
Log of Assets	0,140*	-0,044	0,893**	1		
EPS	0,241**	0,497**	0,093	0,056	1	
D/E Ratio	0,023	-0,031	0,151*	0,171*	-0,002	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 85. Correlation full sample 2013, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,566**	1					
Operating Profit/ Sales Ratio	-0,183*	-0,119ψ	1				
Log of Sales	-0,189**	-0,209**	-0,079	1			
Log of Assets	-0,200**	-0,183*	0,188**	0,889**	1		
EPS	-0,551**	-0,349**	0,308**	0,093	0,078	1	
D/E Ratio	0,067	0,145*	-0,163*	-0,024	-0,06	-0,053	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 86. Correlation full sample 2013, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,713**	1				
Log of Sales	-0,088	0,027	1			
Log of Assets	0,182*	0,107ψ	0,889**	1		
EPS	0,286**	0,457**	0,093	0,078	1	
D/E Ratio	-0,160*	-0,385**	-0,024	-0,06	-0,053	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 87. Correlation full sample 2014, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,449**	1					
Operating Profit/ Sales Ratio	-0,023	0,025	1				
Log of Sales	-0,250**	-0,096ψ	-0,142*	1			
Log of Assets	-0,245**	-0,121ψ	0,123ψ	0,892**	1		
EPS	-0,363**	-0,203**	0,348**	0,006	0,003	1	
D/E Ratio	0,122ψ	0,069	0,194**	0,007	0,031	0,411**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 88. Correlation full sample 2014, accounting

	Accounting stock Return (Rit-Rft)	Market level acc. return (Rmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (Rmt-Rft)	0,728**	1				
Log of Sales	-0,151*	-0,148*	1			
Log of Assets	0,114ψ	-0,099ψ	0,892**	1		
EPS	0,332**	0,555**	0,006	0,003	1	
D/E Ratio	0,197**	0,235**	0,007	0,031	0,411**	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 89. Correlation full sample all years, market

	Stock Return (Rit-Rft)	Market Return (Rmt-Rft)	Operating Profit/ Sales Ratio	Log of Sales	Log of Assets	EPS	D/E Ratio
Stock Return (Rit-Rft)	1						
Market Return (Rmt-Rft)	0,390**	1					
Operating Profit/ Sales Ratio	-0,065*	0,011	1				
Log of Sales	-0,189**	-0,111**	-0,083**	1			
Log of Assets	-0,175**	-0,087**	0,146**	0,895**	1		
EPS	-0,458**	-0,207**	0,293**	0,071*	0,043ψ	1	
D/E Ratio	0,044ψ	-0,015	0,009	0,012	0,017	0,063*	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)

Appendix 90. Correlation full sample all years, accounting

	Accounting stock Return (ARit-Rft)	Market level acc. return (ARmt-Rft)	Log of Sales	Log of Assets	EPS	D/E Ratio
Accounting Stock Return (ARit-Rft)	1					
Market level acc. return (ARmt-Rft)	0,728**	1				
Log of Sales	-0,089**	-0,043ψ	1			
Log of Assets	0,140**	-0,007	0,895**	1		
EPS	0,275**	0,476**	0,071*	0,043ψ	1	
D/E Ratio	0,011	-0,058ψ	0,012	0,017	0,063*	1

**- Correlation is significant at 0,01 level (2-tailed)
* -Correlation is significant at 0,05 level (2-tailed)
ψ - Correlation is significant at 0,1 level (2-tailed)